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THE UNIVERSITY OF ALBERTA

STUDENT TEACHERS' SENSE OF TEACHING EFFICACY AND ACADEMIC LEARNING TIME IN PHYSICAL EDUCATION

BY

LINDA P. THOMPSON

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF SECONDARY EDUCATION

EDMONTON, ALBERTA

SPRING, 1988

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THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled "Student Teachers' Sense of Teaching Efficacy and Academic Learning Time in Physical Education" submitted by Linda P. Thompson in partial fulfilment of the requirements for the degree of Doctor of Philosophy.

(Supervisor)

(External Examiner)

Date: April 15, 1988

DEDICATION

To Jean, who believed in me.

ABSTRACT

The purpose of this study was to examine the relationship between student teachers' sense of teaching efficacy beliefs with pupils' opportunitity to achieve a specified motor skill objective in physical education. The dependent variable was the amount of time pupils were successfully engaged in relevant motor activities (ALT-PE(M)) and was the criterion of teacher effectiveness. The independent variables were selected presage and context variables and measures of student teachers' personal (PTE) and general teaching efficacy (GTE) beliefs.

During their high school practicum thirty secondary physical education major student teachers, who had completed the Teacher Efficacy Scale, voluntarily taught a single gymnastics lesson based on a specified lesson objective. The lessons were videotaped so that three randomly selected pupils could be coded each lesson using the Academic Learning Time in Physical Education Coding System (1982).

The class was the unit of analysis. The results indicated that there were no systematic relationships between a student teacher's teaching efficacy beliefs and presage and context variables measured. Student teachers who had completed a relevant course for the lesson objective obtained higher pupil motor engagement rates

($F_{(1,28)}$=3.96, P=.056). Student teachers who were in a low teaching efficacy group spent significantly more time on management activities. Pupils of high efficacy teachers spent more time on practice of the routine closely relating to the motor skill objective. There were no significant differences in the amount of motor engagement time or ALT-PE(M) for pupils of student teachers in high and low teaching subgroups.

Student teachers who believed they could overcome obstacles to teaching the gymnastics lesson (GTE beliefs) tended to achieve higher pupil ALT-PE(M) rates (r=-.22, P=.12). PTE beliefs were correlated with motor engagement rates but not in the hypothesized direction (r=-.24, P=.10). Neither belief variable was significantly correlated with ALT-PE(M). Although no measure of pupil efficacy beliefs for the lesson objective were taken, it was felt through interview data and the researcher's direct observation of lessons that the pupils played an active role in determining the extent to which the lesson objective was achieved in this study.

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CHAPTER ONE

THE RESEARCH QUESTION

Introduction

Student learning is assumed to be the primary goal of the teaching endeavor. This assumption has been the focus of research in which the process-product paradigm has been used to examine teacher and pupil process behaviors and their relationships to pupil achievement (Dunkin & Biddle, 1974). Research on teacher effectiveness has placed an emphasis on studying interactive teaching by examining behaviors that ultimately result in pupil learning.

Fenstermacher (1978) stated that process-product research usually leads to the formation of rules necessary for effective teaching to occur. He suggested that the researcher's attention should start with beliefs teachers already hold. This proposition is based upon the assumption that in order to change the practices of teachers it is necessary to know their subjective beliefs. There is evidence which indicates that teacher behavior is influenced by what they think (Clark & Peterson, 1986). Thus, the relationship between thought and action should become a critical issue for research on teaching (Fenstermacher, 1978; Jackson, 1968; Shulman & Lanier, 1977).

Studies of teacher thinking may help explain some of the findings of process-product research (Clark & Peterson, 1986). A model of the teaching process which includes two linked domains (teachers' thought processes and teachers' actions and their observable effects) has been suggested by Clark and Peterson (1986). Because of their internal nature the domain of teachers' thought processes is unobservable. However, the action domain is observable in terms of teachers' classroom behavior, pupils' classroom behavior and pupil achievement outcomes. Process-product research has focused upon the action domain. Research on teachers' thinking has tended to focus upon planning, decision making while teaching, beliefs about pupils, attributions for causes of pupil behavior, general teacher concerns, and perceptions of success in teaching.

Yerg (1986) presented a model of the presage-process-product paradigm which is useful for selecting variables for the study of teachers' thought processes and actions. The model provides researchers with a variation of the process-product paradigm incorporating the influence of teachers' thoughts which can be a basis for research in teacher effectiveness in physical education. The model includes presage (precedes interactive teaching), process (teacher and student interactive behaviors) and product (learning outcomes)

dimensions as described by Dunkin and Biddle (1974). There is evidence that the presage variable of teacher knowledge influences that which follows including planning, management, interactive process behaviors and ultimately student learning products (Elbaz, 1983; Yerg, 1981b, 1986).

It has been theorized that teachers' beliefs are important presage variables and that teachers make causal attributions about their own teaching effectiveness in relation to their belief systems (Ames, 1983; Cooper, 1979). Teachers may interpret feedback received as a result of teaching according to personal beliefs and thus impact their teaching behavior.

Classroom research has provided support for the notion that teacher beliefs influence teacher-pupil interactions as well as success in producing pupil achievement (Armor et al., 1976; Ashton, Webb, & Doda, 1983; Berman, McLaughlin, Bass, Pauly, & Zellman, 1977; Dembo & Gibson, 1985). Thoughts about "...the extent to which teachers believe they can affect student learning" have been identified as sense of teaching efficacy (Dembo & Gibson, 1985, p. 173). Data from classroom observations indicated that teaching behaviors of high and low efficacy teachers yield important differences in pupil achievement (Ashton, Webb, & Doda, 1983; Gibson & Dembo, 1984). The descriptive data suggested that high

efficacy teachers maintained an academic orientation within a supportive environment and these behaviors tended to be characteristic of effective teachers as described in process-product research (Brophy, 1979; Brophy & Good, 1986; Good, 1979). One could predict that high efficacy teachers who believe that pupil achievement is influenced by effective teaching, and who have confidence in their own teaching abilities, would provide greater academic focus in their lessons and more opportunities to learn for their pupils. Research on student use of time has been recommended in order to investigate the relationship between teachers' sense of teaching efficacy and pupil learning opportunities (Rosenshine, 1979).

The construct of teachers' sense of efficacy was first used in educational research in two Rand Corporation studies which reported a significant relationship between teachers' sense of efficacy and pupil achievement (Armor et al., 1976; Berman, McLaughlin, Bass, Pauly, & Zellman, 1977). In the Rand studies teachers' sense of efficacy was measured with two Likert scale items. Further research using these two items has supported the relationship between teachers' sense of efficacy and pupil achievement (Ashton & Webb, 1982; Ashton, Webb, & Doda, 1983). However, no strong relationships were found between teacher efficacy beliefs

and their process behaviors in the classroom (Ashton & Webb, 1986). Recent investigations have added to an understanding of teachers' sense of efficacy (Ashton, Webb, & Doda, 1983; Buhr, Crocker, & Ashton, 1983; Gibson & Dembo, 1984; Webb, 1982). These studies have been based on Bandura's (1977) theory of self-efficacy which proposed that one's behavior is determined by a general outcome expectancy (belief that behavior will lead to desirable outcomes) as well as a sense of self-efficacy (belief that one has the requisite skills to bring about the outcome). Researchers applied these concepts to teachers and suggested that a teachers' sense of efficacy is composed of two factors: general teaching efficacy (GTE) which relates to the degree that students could be taught given certain conditions, and personal teaching efficacy (PTE) which indicates a teacher's rating of personal ability to perform the necessary tasks to bring about pupil learning (Ashton, Webb, & Doda, 1983).

The research on teachers' sense of efficacy has provided information about the nature of the construct, the strength of the relationship to teacher process behaviors in the classroom and the relationship to pupil achievement. However, empirical evidence of the predictive nature of the influence of teachers' sense of efficacy on pupil achievement is lacking. Researchers have shown that teachers' sense of efficacy varies for

different contextual situations. To date, research has concentrated on classroom situations primarily in reading, mathematics and language. Classroom process data have been based on ethnographic observations and perceptions, an engagement rating form indicating how many pupils are engaged at a given time, and an instrument which describes instructional methods (Ashton & Webb, 1986). One study utilized teacher-use-of-time and question-and-feedback sequence instruments for classroom observations (Gibson & Dembo, 1984). However, these instruments were not sensitive to pupil process behaviors. There is only one known pilot study that has investigated teachers' sense of efficacy in relation to physical education and the learning of motor skills in the gymnasium setting (Metzler & Reif, 1986). Since teachers are faced with very different conditions for teaching (e.g., the gymnasium, pool, field) and pupils face very different skills to be learned (e.g., motor versus cognitive skills) it would be useful to determine the influence of teachers' sense of efficacy on pupil achievement in physical education.

The Problem

Attempts at studying process-product relationships between observed activities in the learning environment and subsequent pupil achievement have been carried out

with the hope of better understanding the determinants of learning (Dunkin & Biddle, 1974). In physical education, process-product studies have examined teacher process behaviors that affect the learning of motor skills. Descriptive research has led to the importance of time-on-task as a process variable that relates to pupil learning. The academic learning time concept grew out of a project called the Beginning Teacher Evaluation Study which attempted to identify variables that affected achievement in elementary reading and mathematics (Denham & Lieberman, 1980). Academic learning time was defined as the amount of class time in which a pupil is engaged in relevant tasks at a high success rate and was found to be a significant predictor of pupil learning (Fisher et al., 1981). The academic learning time in physical education (ALT-PE) observation instrument (Siedentop, Birdwell, & Metzler, 1979; Siedentop, Tousignant, & Parker, 1982) resulted from work done by the Beginning Teacher Evaluation Study researchers and is a highly valid and reliable data collection instrument for observing in physical education contexts (Anderson, 1983; Metzler, 1980, 1985; Rife, Shute, & Dodds, 1985). The ALT-PE instrument (Siedentop, Birdwell, & Metzler, 1979; Siedentop, Tousignant, & Parker, 1982) is particularly sensitive to time intervals in which pupils are successfully engaged in relevant motor tasks and

researchers have suggested that motor academic learning time (ALT-PE(M)) is the best indicator of learning in physical education classes because of its emphasis on successful and appropriate motor engagement time (Metzler, 1980, 1985; Siedentop, 1983a).

A number of descriptive studies have been completed using the original ALT-PE instrument (Siedentop, Birdwell, & Metzler, 1979) as well as the revised ALT-PE instrument (Siedentop, Tousignant, & Parker, 1982). Descriptive data has indicated that pupils have very low engagement rates resulting in very low percentages of accrued ALT-PE(M) rates (Aufderheide, Olson, & Templin, 1980; Godbout, Brunelle, & Tousignant, 1983; Grant, 1983; Lawless, 1985; Martinek & Karper, 1983; McKenzie, 1986; McKenzie, Clark, & McKenzie, 1984; Metzler, 1980, 1981, 1986a; Placek & Randall, 1986; Placek, Silverman, Shute, Dodds, & Rife, 1981; Rate, 1981; Rife, Shute, & Dodds, 1985; Shute, Dodds, Placek, Rife, & Silverman, 1982; Silverman, Dodds, Placek, Shute, & Rife, 1984; Wuest, Mancini, Van der Mars, & Terrillion, 1986).

Many studies have not reported significant correlations between ALT-PE(M) rates and other teacher process variables measured. However, there is an indication that certain processes tend to decrease the amount of ALT-PE(M) rates (e.g., pupil time in waiting, transition, knowledge focus or not engaged) (Aufderheide,

McKenzie, & Knowles, 1982; DePaepe, 1985; Dodds, 1983; Mancini, Wuest, Clark, & Ridosh, 1983; Metzler, 1983a; Paese, 1985, 1986; Silverman, 1982, 1985b; Silverman, Dodds, Placek, Shute, & Rife, 1984; Wurzer, 1983; Young & Metzler, 1982).

Some efforts to examine the relationship between ALT-PE(M) in physical education and pupil achievement have utilized the experimental teaching unit (ETU) which is a short, standardized instructional unit based on a specified goal, objective or learning outcome (Metzler, 1983c; Metzler & Young, 1984; Paese, 1984, 1985, 1986; Young, 1981; Young & Metzler, 1982). The ETU has allowed researchers to study variables with a high degree of ecological validity in an environment similar to naturally occurring settings (Graham, Soares, & Harrington, 1983; Pieron & Graham, 1984). Studies using the ETU concept have indicated that time spent on management activities is significantly related to pupil achievement. Few other teacher process behaviors have been consistently related to student achievement and this seems to be true in physical education (O'Sullivan, 1986; Pieron & Graham, 1984; Yerg, 1981a). However, research has indicated that the pupil process variable of engaged time is a powerful predictor of pupil learning in an ETU lesson for a specified motor skill objective (Metzler &

Young, 1984; Yerg, 1981b; Young, 1981; Young & Metzler, 1982).

In order to maximize pupil achievement it would seem logical to assume that teachers would attempt to influence pupil processes when planning and conducting a lesson. Being mindful of the influence of teachers' thought processes on teachers' actions, recent studies have attempted to describe various aspects of teachers' concerns and conceptions of successful teaching. Researchers have studied teacher concerns as a presage variable that may influence teacher behavior in physical education (Boggess, McBride, & Griffey, 1985; Fuller, 1969; McBride, 1984; McBride, Boggess, & Griffey, 1986; Wendt, Bain, & Jackson, 1981). Others have studied teachers' conceptions of successful or effective teaching (Arrighi & Young, 1987; Borys & Fishburne, 1986; Earls, 1981; Fishburne & Borys, 1986; Harootunian & Yarger, 1981; Placek, 1983; Schempp, 1983, 1985, 1986; Zahorik, 1980).

In studies of teachers' thoughts it has been reported that teachers view pupil behavior as a concern but seldom suggest pupil achievement as a primary concern (Arrighi & Young, 1987; Borys & Fishburne, 1986; Earls, 1981; Fishburne & Borys, 1986; McBride, 1984; Placek, 1983; Schempp, 1985, 1986; Zahorik, 1980). Zahorik (1980) found teachers' recommendations for using verbal

behavior were related to motivation, involvement, thinking and self-concept but not pupil achievement. Earls (1981) found that teacher satisfaction was related to teacher and pupil interaction and both pupil enjoyment and success were important. Placek (1983) reported that teachers' planning decisions were based upon concerns for pupil behavior and that pupil enjoyment, participation and behavior took precedence over student achievement. Planning decisions in physical education have been found to differ significantly for experienced or preservice teachers with inexperienced teachers attending to pupil interest and on task behavior and experienced teachers attending to pupil performance (Housner & Griffey, 1985). Harootunian and Yarger (1981) reported that teachers viewed success in terms of positive pupil attitudes rather than student learning gains. Placek (1983) found student teachers viewed success if pupils liked physical education, were learning or were participating. Borys and Fishburne (1986) replicated the Placek study and found similar results. Schempp (1985) also found that student teachers thought pupil social control and attitudes were more important variables for determining better teachers than were pupil cognitive processes or psychomotor performance.

Some studies have provided contradictory evidence to the suggestion that teachers do not view pupil learning

as a priority in teaching. Two studies of physical education teachers reported that teachers held concerns for pupil learning above other concerns (Boggess, McBride, & Griffey, 1985; McBride, Boggess, & Griffey, 1986). It has also been reported that student teachers' concerns did not change significantly during student teaching (Wendt, Bain, & Jackson, 1981). Earls (1981) concluded that physical education teachers perceived as effective had a desire to be more successful with pupils who were hard-to-reach.

Studies of teachers' conceptions of effective teaching appear to indicate that the assumption that pupil learning is a primary goal of teaching is not held by many teachers (either inservice or preservice). Most of these studies have developed categories of concerns as a result of analyzing written responses from the critical incident technique. The categories emerged from groupings of similarly recorded incidents. Although the researchers endeavored to develop reliable categories by checking and rechecking data in various ways, they still had to rely on responses they were given with no recourse to probe for further meaning. Thus, a category of responses relating to keeping pupils busy, for example, was primarily based on grouping incidents using similar terms for the word busy. In many cases the descriptors could be related to pupil learning. In physical

education classes, for example, it would seem logical to expect that pupils should be busy and active in order to achieve lesson goals. Participation is necessary to achieve motor learning. Success is also necessary for the learning of motor skills.

Although descriptions about various aspects of teachers' thoughts, concerns and actions are valuable there is need to study the influence of those thoughts on teachers' actions and their subsequent effects on pupil behavior and learning. Schempp (1985) raised the issue regarding what the relationship of the definitions of better teaching has on observable teaching practices: Does pupil learning suffer when teachers' conceptions of teaching relate to keeping pupils busy, happy and good? Research efforts should attempt to measure the influence of teachers' concerns and perceptions of teaching on pupil achievement.

Perhaps the teachers' beliefs about their teaching and pupils' learning in physical education influence behaviors relating to increased pupil learning. The research on teacher conceptions of effective teaching may be reflecting teachers' sense of power to influence pupil learning rather than the belief that pupil learning is not really of great concern to them. Keeping pupils busy may indicate a concern for pupil engagement time. Keeping pupils happy may indicate a concern for pupil

success. Keeping pupils good may indicate a concern for managerial skills relating to pupil behavior. Teachers' sense of teaching efficacy may influence how pupils will be engaged during class time and differing amounts of teachers' sense of efficacy for the teaching of a motor skill objective may result in significantly different amounts of ALT-PE(M) for pupils. To date, there are no studies in physical education that address this hypothesis.

Purpose of the Study

Research has indicated that teachers' sense of teaching efficacy influences patterns of behavior known to yield pupil achievement gains (Ashton, Webb, & Doda, 1983; Gibson & Dembo, 1984). It has also been found that there are behavioral differences between high and low efficacy teachers. These behavioral differences affect pupil engagement time. Some researchers believe that a teachers' sense of teaching efficacy can be a predictor of teacher behavior (Ashton, Webb, & Doda, 1983). One could speculate that teachers who believe that pupil learning can be influenced by effective teaching and who also have confidence in their own teaching abilities would provide an environment such that pupil opportunity for learning is enhanced.

There is research evidence to support the importance of successful time on relevant tasks for achievement gains to occur (Denham & Lieberman, 1980). Academic learning time has been found to be a predictor of pupil learning (Fisher et al., 1981). The ALT-PE observation instrument (Siedentop, Birdwell, & Metzler, 1979; Siedentop, Tousignant, & Parker, 1982) is sensitive to the amount of time pupils are successfully engaged in relevant motor tasks in physical activity settings by measuring the amount of ALT-PE(M) rates accrued by pupils. In order to maximize pupil learning it would seem logical to assume that teachers would attempt to influence pupil opportunity to learn and thus affect the pupil's academic learning time. Teachers' sense of teaching efficacy may influence the amount of time pupils are engaged successfully in appropriate tasks and differing amounts of teachers' sense of teaching efficacy may result in significantly different amounts of ALT-PE(M) in physical education lessons.

The purpose of this study was to assess the influence of student teachers' sense of teaching efficacy on pupil opportunity to learn in physical education classes as indicated by their rates of ALT-PE(M). If teachers' sense of teaching efficacy beliefs have the potential to influence both the behavior of teachers and pupil opportunity to learn, and if student teaching is a

time when these beliefs are being developed on the part of the teacher, then research on the influence of student teachers' sense of teaching efficacy beliefs on pupil opportunity to learn would provide useful information on the impact of teachers' beliefs on pupil learning opportunities. Specifically, this study focused on the following purposes:

1. to describe student teachers' general teaching efficacy (GTE) and personal teaching efficacy (PTE) beliefs in relation to a specific motor learning goal for a lesson,

2. to describe the behaviors occurring during lessons that influence pupil opportunities to achieve the motor skill objective,

3. to assess the relationship of student teachers' general and personal teaching efficacy beliefs with pupil behaviors relating to opportunity to learn in physical education as indicated by pupil motor engagement rates and ALT-PE(M) in physical education,

4. to assess the relationship of presage and context variables with student teachers' teaching efficacy beliefs and measures of pupil opportunities to achieve the motor skill objective, and

5. to examine the relative importance of selected variables to the predictability of pupil opportunities to achieve the motor skill objective.

Significance of the Study

> "Teacher sense of efficacy is a construct thought by researchers to intervene between many variables that contribute to the perception by the teacher of his performance as well as to his actual performance and to the achievement of his students. In other words, a teacher's confidence in his potential effectiveness is thought to be a basis for more productive teaching" (Denham & Michael, 1981, p. 39).

Sense of teaching efficacy is considered to be a variable which influences teachers' actions. Most research on sense of teaching efficacy has stemmed from attribution theory and Denham and Michael (1981) suggested that causal attributions influence teachers' sense of efficacy. "The causes to which a person attributes success or failure are thought to mediate the effect of success or failure on a person's actions" (Denham & Michael, 1981, p. 56). The assumption is that a teacher's perceptions give direction to teaching behavior which will, in turn, influence pupils. The more effective teacher will be one who persists in having pupils achieve goals and who uses effective process behaviors to achieve learning goals.

If it is the case that teachers' sense of teaching efficacy does influence teachers' behavior and pupils' achievement then it would become imperative to determine ways to manipulate the antecedents of a teacher's sense of teaching efficacy. Denham and Michael (1981) suggested that the antecedents of teachers' sense of

teaching efficacy are teacher training, teaching experiences, school system variables and personal variables. Weiner (1976) stated that training programs that change perceptions of the causes of success and failure do influence achievement related behavior. Perhaps sense of teaching efficacy may become an important aspect of teacher training. An important aspect of academic learning time is that pupils must be successful. Success on the part of the pupil should positively influence teacher behavior and successful teaching experiences should increase a teacher's sense of teaching efficacy. It becomes clear that there is a need to determine the extent to which teachers' sense of teaching efficacy influences pupil academic learning time opportunities. Once this relationship is determined then attention could focus on effective ways to manipulate teachers' sense of teaching efficacy in order to improve pupil academic learning time. The impact of a variety of variables on teachers' sense of teaching efficacy could lead to the identification of pertinent variables for potential manipulation. It should initially be established that the manipulation will be for a worthy cause, that of pupil achievement.

This research study has added to the information available on teachers' perceptions of teaching and learning. It has provided descriptive data on student

teachers' sense of teaching efficacy beliefs and has indicated the strength of the relationship between those beliefs and measures of pupil opportunity to learn in physical education. This study has also explored the contribution of presage variables to the prediction of variables providing pupils opportunity to learn. The relationships of variables included in this study have provided further evidence that tests the hypothesis that teachers' thoughts and beliefs are related to behaviors that influence pupil learning.

Delimitations

This study investigated the beliefs of senior secondary physical education student teachers during a field experience at the high school level. The study focused only on student teachers' sense of teaching efficacy in relation to a high school experimental lesson objective. Generalization to experienced teachers or other school grade levels will be impossible.

The student teachers planned and taught a lesson based on a specific motor skill objective. This study measured sense of teaching efficacy for a single lesson and did not attempt to measure changes in sense of teaching efficacy over time. Also, this study focused upon a specific activity and generalization of the

relationship of student teachers' sense of teaching efficacy to other activities will be impossible.

The sample of student teachers had received instruction in teaching skills prior to their field experience. Thus, it was assumed that the student teachers were knowledgeable about teaching techniques that would enhance pupil opportunity to learn in physical education. This study did not attempt to measure the capabilities of the student teachers in their use of different teaching techniques.

This study took place at a large teacher preparation institution and investigated the sense of teaching efficacy of students in that program. The student teaching experiences took place in urban areas and so comparisons cannot be made to other locations.

Definition of Terms

Efficacy: is the belief in the power to affect an outcome.

General teaching efficacy (GTE): the extent to which a teacher believes that any good teacher could teach pupils under a given set of conditions.

Personal teaching efficacy (PTE): a teacher's belief in his or her own personal ability to perform in such a way as to bring about pupil learning.

Motor engagement time: the amount of time in which a pupil is engaged in motor responses that are of a successful, inappropriate or assisting nature.

Motor academic learning time in physical education (ALT-PE(M)): the amount of time in which a pupil is engaged successfully in relevant motor tasks by performing motor responses that are appropriate or easily accomplished with few errors.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Introduction

The research findings and theoretical formulations about teacher effectiveness in general education and in physical education form the basis of this review of related literature. Pupil academic learning time has been used in educational research as an indicator of teaching effectiveness and has been adopted by researchers in physical education. Teachers' actions have been linked to teachers' thoughts and beliefs. A model which has been useful for the analysis of literature on teachers' thoughts and actions is presented and used as the basis for this chapter's organization. Research findings relating to teachers' thoughts and actions in education in general and physical education in particular are summarized. A model for further research on physical education teachers' thoughts and actions is presented at the conclusion of this chapter.

A model for the study of teacher thoughts and actions. Teacher behavior is influenced and possibly determined by teachers' thought processes (Clark & Peterson, 1986). This assumption has been studied in a variety of ways since the late 1970's. In an effort to understand and explain the observable behaviors exhibited during teaching some researchers focus on teachers'

thoughts. It is believed that the literature on teachers' thought processes compliments the research on teacher effectiveness which has primarily focused upon overt teacher and student behavior (Clark & Peterson, 1986). A model depicting the domain of teachers' thought processes and the domain of teachers' actions was developed by Clark and Peterson (1986) to facilitate the understanding of the research on teaching (see Figure 1).

Figure 1 is omitted because of the unavailability of copyright permission. See Clark, C., & Peterson, P. (1986). Teachers' thought processes. In M. Wittrock (Ed.), Handbook of research on teaching, (3rd. ed.). New York, NY: Macmillan Publishing Company, p. 257.

The action domain includes observable teacher and pupil behaviors (processes) and pupil achievement (product). This domain has been the focus of teacher effectiveness research and has often used the process-product paradigm for investigations. The thought processes domain includes teacher planning, thoughts and decisions while teaching, as well as teacher beliefs and knowledge. The focus of research has included teacher planning, decision making, judgment, implicit theories, expectations, attributions and, more recently, self-efficacy. Both domains are considered to be influenced

by constraints or opportunities that appear in the teaching context and the relationship between the domains is considered to be reciprocal (Clark & Peterson, 1986).

Ames (1983) suggested that teachers assign a degree of importance to various aspects of teaching and that information about their own teaching and student behavior is processed in relation to the value orientation they hold. Ames and Ames (1984) proposed "...that perceptions are imbedded in a set of beliefs and values that have important implications for understanding subsequent teacher actions" (p. 546). Information about pupil performance is interpreted through the belief system and teachers are motivated to behave in certain ways in relation to their belief system. It was suggested that the belief about the relationship of a teacher's own teaching behavior to student learning is perceived in relation to key beliefs about teaching (Ames, 1983). Although the research on teachers' thought is relatively new, there is evidence which indicates that teachers do have belief systems that influence their perceptions, plans, and actions (Clark & Peterson, 1986). Teachers' thinking and action are thought to be mediating factors which influence the outcome of teaching and are both important aspects for study in teacher effectiveness research.

Teacher Thinking/Perceptions about Pupil Learning

Research findings in general education. The teacher can be viewed as an active agent who processes information and who acts upon judgments, decisions and reflections in the process of teaching and teaching behavior is believed to be due, in part, to such thinking processes (Shulman & Lanier, 1977). Since pupil learning is thought to be a goal of teaching and a measure of teacher effectiveness, some researchers have investigated teachers' thoughts to determine if teachers believe pupil learning is their prime concern.

Conners (1978) identified teachers' role conception as a factor influencing teacher behavior and the way they interact with pupils. Webb (1982) found that teachers were consistent in reporting their perceptions of what teachers should be and do. It has been suggested that ultimate concerns of the teacher deal with pupil learning but the teacher's primary concerns deal with activities that maintain pupil involvement (Jackson, 1968). Harootunian (1980) found supporting evidence that classroom teachers define success in terms of primary concerns. Teachers have reported that maintaining pupil involvement in the topic and positive pupil attitude were indicators of successful teaching (Harootunian & Yarger, 1981). Teachers have indicated that their main interest was with the impact of teaching behavior on student

motivation, involvement, thinking and self-concept rather than pupil achievement (Zahorik, 1980).

Of the many variables affecting teaching behaviors, Fuller (1969) proposed that the teacher's own concerns are the most influential. Fuller (1969) proposed that teacher's concerns change as they pass through stages in conjunction with experience and maturity. Initially, behavior is governed by self-concerns and the demands of the situation. One progresses to concerns for the task and quality of one's performance and eventually a concern for one's impact on others becomes the focus of one's teaching behavior. These stages of concern resulted from research done with student teachers (Fuller, 1969).

There is evidence that teachers' beliefs in their ability to influence pupil learning (sense of efficacy) varies with experience. Gibson and Brown (1982) found that preservice teachers with little training had the least confidence in their teaching skills but had very high ratings for the belief that good teaching could overcome situational constraints. They also found that belief in personal teaching ability rose for preservice teachers, decreased for student teachers in their final field experience, increased again for beginning teachers, and then decreased as more teaching experience was gained. Webb (1982) also found that preservice teachers

had higher ratings of their personal ability to influence pupil learning.

Studies show a relationship between teachers' thoughts about attributions for the causes of pupil performance and teacher behavior towards the pupil (Nespor, McCuller, & Campos, 1984; Weiner, 1979). It has been found that teachers vary their behavior according to expectations they have for high or low pupil achievement (Cooper, 1979; Nespor, McCuller, & Campos, 1984). Research supports the hypothesis that teachers' sense of efficacy or their belief in their ability to influence pupil learning, is related to pupil achievement (Armor et al., 1976; Ashton & Webb, 1986; Berman, McLaughlin, Bass, Pauly, & Zellman, 1977; Gibson & Dembo, 1984). Bandura (1977) suggested that there is a reciprocal relationship between teachers' thoughts of perceived self-efficacy and behavior. Ashton and Webb (1986) suggested that teacher perceived efficacy is an integrative construct related to motivation theories of behavior such as attribution theory, personal causation, expectancy theory and intrinsic motivation. They suggested that sense of efficacy may be useful in explaining research findings from several motivation theory perspectives because sense of efficacy influences teacher behavior. The construct of teachers' sense of efficacy is a very promising

teacher thought variable for the study of teacher effectiveness.

Research findings in physical education. Some studies which examine physical education teachers' perceptions of effective teaching have indicated teachers' lack of concern for pupil achievement (Borys & Fishburne, 1986; Earls, 1981; Placek, 1983; Schempp, 1985). Placek (1983) reported that physical education teachers' planning decisions were based on concerns for pupil behavior and teachers viewed success in terms of keeping pupils busy, happy and good. Borys and Fishburne (1986) found similar results when they replicated the Placek (1983) study. Teachers reported that pupil social control and attitudes were important indicators of better physical education teachers than were pupil cognitive processes or psychomotor performance (Schempp, 1985). Earls (1981) concluded that distinctive physical education teachers love children and achieve satisfaction from teaching in relation to interactions with pupils that provide enjoyment, success and long-term effects on pupils. Distinctive teachers were also found to have a desire to be more successful with hard-to-reach pupils.

The concerns and perceptions of student teachers have been studied in relation to physical education. Arrighi and Young (1987) found significant differences between inservice and preservice teachers regarding

perceptions of successful teaching. Inservice teachers indicated the primary indicator of success was related to pupils' response including skill performance. Preservice teachers indicated the pupils' response as important and also felt that effective physical education teachers are good role models that could use a variety of components identified as effective techniques. Fuller's model was not substantiated in this study because student teachers seemed to be concerned initially with task-oriented learning followed by a concern for self (Arrighi & Young, 1987). Wendt, Bain, and Jackson (1981) tested Fuller's model of concerns and found that a concern for self was an initial concern of physical education student teachers but that task and impact concerns were not arranged in a hierarchical order. The Fuller (1969) model suggested that impact on learners should become more of a concern over time. Groups of student teachers, cooperating teachers and university supervisors were found to rate self concerns highest but ratings for task and impact concerns between these three groups were not highly correlated, suggesting that the three groups had different concerns (McBride, 1984). It has been found that over a semester student teacher concerns did not decrease significantly but the pattern of change indicated an increasing concern for pupil learning (Boggess, McBride, & Griffey, 1985). Fuller's theory was

confirmed when experienced physical education teachers reported that they were concerned with impact of instruction on pupils (McBride, Boggess, & Griffey, 1986). They also found that these physical education teachers had a moderate concern for maintaining class control suggesting that some concerns may not diminish as a result of experience.

A study on physical education student teachers' beliefs in their control over pupil learning indicated that responsibility for pupil learning decreased from the beginning to the end of a student teaching experience (Schempp, 1986). It was suggested that perceiving pupil failure as outside the teacher's responsibility might encourage the teacher to try less to overcome pupil failure. Templin (1981) found that student teachers defined success as having control of the social behavior of their pupils. Schempp (1985) also reported that student teachers were concerned with ability to control pupil behavior and that this definition of successful teaching did not change with more experience.

Studies of physical education teachers' thoughts have focused upon teachers' concerns and perceptions of successful teaching. There are no known studies in physical education which examine the relationship of teachers' concerns or perceptions of successful teaching to teaching behaviors or pupil learning. Perhaps

physical education teachers are more concerned with prerequisite conditions necessary for learning to ultimately take place (Placek, 1983). One study found that teacher expectations of pupils did influence the amount of pupil successful engagement in appropriate tasks in physical education (Martinek & Karper, 1983). Much more evidence is needed in order to generalize about the concerns of physical education teachers and to draw implications about the impact of those concerns to teaching behavior and pupil learning. Many other teacher thought processes remain unexamined in relation to physical education teachers at this time.

Research on teachers' sense of efficacy. Self-efficacy theory developed from expectancy-value theories based on the premise "...that people are likely to choose to engage in behaviors that they believe will result in desirable outcomes" (Maddux & Barnes, 1984). Bandura (1977) postulated that an expectancy held by a person can be viewed as two related components: an outcome expectancy is a belief that certain behaviors will lead to certain outcomes, and a self-efficacy expectancy is a belief that the person is able to perform the requisite behaviors. Bandura (1977) presented a theoretical framework proposing that behavior is regulated through a cognitive mechanism called sense of self-efficacy. He emphasized that behavior was influenced by outcome

expectations, when a person believed certain behaviors would produce a desired outcome, and efficacy expectations, when a person felt he/she was capable of performing the behavior. An affective component includes the sense of pride or shame associated with sense of efficacy (Denham & Michael, 1981).

Research on outcome expectancy has dominated psychological inquiry into expectancy-value theories while studies on self-efficacy expectancy are far more scarce (Maddux & Barnes, 1984). Recent self-efficacy research has focused on psychotherapy, counselling and behavior change applications. Research has indicated that self-efficacy and changes in behavior are highly correlated and that self-efficacy is a predictor of behavior (Bandura, Reese, & Adams, 1982; Maddux & Barnes, 1984; Maddux & Rogers, 1983). Research on self-efficacy assumes that self-efficacy expectancy is a predictor of behaviors whose outcomes are valued by the individual performing the behavior. Maddux and Barnes (1984) suggested that researchers should take into consideration individual differences in the value placed on the outcome of behavior as this may increase predictive accuracy of self-efficacy expectancy. Also, they found that outcome expectancy was a predictor of behavior independent of self-efficacy expectancy and they suggested that measures

of these variables must reflect their theoretical differentiation (Maddux & Barnes, 1984).

Teachers' sense of teaching efficacy refers to the teacher's belief in teaching and his or her personal ability to have a positive effect on pupil learning (Ashton, 1984, 1985; Ashton & Webb, 1982, 1986; Ashton, Webb, & Doda, 1983; Dembo & Gibson, 1985). Teachers' sense of efficacy was initially applied in educational research with two studies in the late 1970's through the use of two Likert style questions (Armor et al., 1976; Berman, McLaughlin, Bass, Pauly, & Zellman, 1977). One question addressed teachers' outcome expectation and the other corresponded to efficacy expectation. Based upon the reported findings of a significant relationship between teachers' sense of efficacy and pupil achievement further study on teachers' sense of efficacy has been completed (Ashton & Webb, 1982, 1986; Ashton, Webb, & Doda, 1983; Buhr, Crocker, & Ashton, 1983; Dembo & Gibson, 1985; Gibson & Dembo, 1984).

Teachers' sense of teaching efficacy is conceived as consisting of two dimensions (Ashton, Webb, & Doda, 1983; Ashton & Webb, 1986). One dimension refers to teachers' outcome expectations and their beliefs that teachers can influence pupil learning in spite of external obstacles. This dimension is referred to as general teaching efficacy (GTE) (Ashton, 1985; Ashton & Webb, 1986;

Ashton, Webb, & Doda, 1983; Buhr, Crocker, & Ashton, 1983). The second dimension refers to personal self-efficacy and beliefs teachers have in their own ability to bring about pupil learning. This dimension is referred to as personal teaching efficacy (PTE) (Ashton, 1985; Ashton & Webb, 1982, 1986; Ashton, Webb, & Doda, 1983; Buhr, Crocker, & Ashton, 1983). It is suggested that "...with training and experience, teachers develop specific beliefs about the ability of teachers, in general, to motivate different types of students in different types of situations and their own personal ability to motivate students in specific situations" (Ashton & Webb, 1982, p. 5).

A model of teachers' sense of teaching efficacy posits several reciprocal relationships among teachers' beliefs (see Figure 2). Generalized beliefs about the extent to which a teacher believes that actions can produce a desired outcome lead to GTE beliefs and to a general sense of effectiveness as a person. The integration of the general sense of teaching efficacy plus general beliefs about self-efficacy lead to the formation of PTE beliefs which are specific beliefs about one's personal ability to influence pupils (Ashton & Webb, 1986).

Figure 2 is omitted because of the unavailability of copyright permission. See Ashton, P., & Webb, R. (1986). Making a difference. White Plains, NY: Longman Inc., p. 5.

The relationship of teachers' sense of efficacy and pupil achievement has been theoretically presented in a model (see Figure 3). Solid arrows indicate relationships found by Ashton and Webb (1986) whereas broken arrows indicate theoretical relationships not yet tested.

Figure 3 is omitted because of the unavailability of copyright permission. See Ashton, P., & Webb, R. (1986). Making a difference. White Plains, NY: Longman Inc., p. 146.

Teachers' sense of teaching efficacy is hypothesized to be an important construct in explaining teacher behavior because "...it is expected to influence the teachers' choice of instructional activities, the amount of effort they expend in teaching, and the degree of

persistence they maintain when confronted with difficulties" (Ashton, 1985, p. 144). A teacher's confidence in his or her teaching effectiveness is considered to be influential to productive teaching (Denham & Michael, 1981). It is predicted that teachers with a low sense of GTE may believe that low achieving pupils cannot be influenced by teaching so they will exert less effort in motivating difficult pupils. These teachers are likely to experience feelings of universal helplessness (Abramson, Seligman, & Teasdale, 1978; Ashton, 1985; Ashton & Webb, 1982, 1986; Ashton, Webb, & Doda, 1983; Bandura, 1977). It is also predicted that teachers with a low sense of PTE may believe that effective teachers can influence low achieving pupils but that they lack the ability to teach such pupils and therefore, their effort and persistence is lessened. These teachers are likely to experience personal helplessness (Abramson, Seligman, & Teasdale, 1978; Ashton, 1985; Ashton & Webb, 1986; Ashton, Webb, & Doda, 1983; Bandura, 1977). According to Bandura (1977) teachers who are high on both outcome expectancy and self-efficacy variables will behave with active responsiveness and persistence to achieve goals while teachers low on both variables will give up readily if they do not get desired results. It is postulated that the relationship between teachers' efficacy beliefs and

pupil achievement is reciprocal and that teachers with high teaching efficacy beliefs have higher expectations for pupil achievement and work harder with their pupils to achieve success. Any success achieved has a positive effect on teachers' sense of teaching efficacy (Ashton & Webb, 1986; Ashton, Webb, & Doda, 1983).

There are many variables that may influence teachers' sense of teaching efficacy. Educational research has identified several variables that influence teachers' attitudes and behavior and therefore are hypothesized to affect teachers' sense of teaching efficacy (Ashton, 1985; Ashton & Webb, 1982; Denham & Michael, 1981). Some pupil characteristics (e.g., ability), teacher characteristics (e.g., years of experience), situational constraints (e.g., class size), the type of activity and teacher role definitions have been identified as influences on teachers' attitudes and behavior (Ashton, 1985; Ashton & Webb, 1982, 1986). It is also suggested that school climate and organization, the nature of the school district and cultural beliefs have implications for teachers' efficacy beliefs (Ashton, 1985; Ashton & Webb, 1982; Ashton, Webb, & Doda, 1983).

The first instrument that measured teachers' sense of efficacy beliefs consisted of the following two Likert-scale items:

1. When it comes right down to it, a teacher really can't do much because most of a student's motivation and performance depends on his or her home environment.
2. If I really try hard, I can get through to even the most difficult or unmotivated students (Berman, McLaughlin, Bass, Pauly, & Zellman, 1977, p. 136-137).

It was found that teachers' scores on these two items have not significantly correlated to each other which suggested that the two items measured two distinct dimensions of efficacy: GTE beliefs and PTE beliefs (Ashton & Webb, 1986; Ashton, Webb, & Doda, 1983).

Ashton, Webb and Doda (1983) included the two Likert-scale items in their study of teachers' efficacy beliefs but also used a Webb Efficacy Questionnaire and Efficacy Vignettes (Ashton & Webb, 1986). The Webb Efficacy Questionnaire measured GTE beliefs and the Efficacy Vignettes measured PTE beliefs. Significant correlations between the Likert-scale item 1 and the Webb Efficacy Questionnaire and between the Likert-scale item 2 and the Efficacy Vignettes indicated support for the two dimensions of teaching efficacy.

The Efficacy Vignettes were used in a study to determine if teachers' efficacy beliefs were a self- or norm-referenced constructs (Buhr, Crocker, & Ashton,

1983). The vignettes were based on responses to teaching incident essays which described most and least effective teaching experiences. It was found that responses to the norm-referenced vignettes were significantly correlated with efficacy as measured by the two Likert-scale items used by Berman, McLaughlin, Bass, Pauly, and Zellman (1977). It was concluded that teachers think of their efficacy beliefs primarily in terms of a norm-referenced construct and evaluate their effectiveness in terms of a comparison to the performance of other teachers (Buhr, Crocker, & Ashton, 1983).

The Webb Efficacy Questionnaire was found to lack internal consistency (Ashton & Webb, 1986). The Efficacy Vignettes were found to be internally consistent but did not correlate significantly with pupil achievement. Thus, there have been reported limitations of the usefulness of these instruments (Ashton & Webb, 1986; Gibson & Dembo, 1984).

The development of a more sophisticated instrument to measure teachers' efficacy beliefs was undertaken by Gibson and Dembo (1984). A thirty item Likert-scale instrument, Teacher Efficacy Scale, was tested and validated to measure GTE and PTE beliefs. It was found that the instrument supported the two dimension conceptualization of teaching efficacy and the instrument discriminated teachers' sense of teaching efficacy from

other constructs. Gibson and Dembo (1984) compared high and low efficacy teachers and suggested that there was a relationship between elementary teachers' sense of efficacy and classroom process behaviors known to influence achievement. Classroom observations completed by Gibson and Dembo (1984) utilized teacher-use-of-time and question-answer-feedback sequence instruments. The teacher-use-of-time variables were collapsed into academic and nonacademic totals. It was reported that there were no significant differences between high and low efficacy teachers for teacher use-of-time variables. The coding instruments did not reflect pupil engagement rates. Anecdotal records were used for process behavior observations. The definitions of GTE and PTE used by Gibson and Dembo (1984) were similar to those used by Ashton, Webb and Doda (1983). Gibson and Dembo (1984) found their instrument supported Bandura's (1977) concept of self-efficacy as well as Ashton, Webb, and Doda's (1983) model of teaching efficacy beliefs. Although the instrument was found to have internal consistency reliability, only sixteen of the original thirty items were found to have significant reliability coefficients (Gibson & Dembo, 1984). It was suggested that further research using the Teacher Efficacy Scale consider the possibility of shortening the number of items from the original thirty.

Research has been conducted to examine if teachers' feelings of efficacy are related to pupil achievement during the interactive phase of teaching. The first studies found that teaching efficacy beliefs were positively related to improved pupil performance in reading (Armor et al., 1976; Berman, McLaughlin, Bass, Pauly, & Zellman, 1977). Ashton, Webb, and Doda (1983) investigated the relationships between teaching efficacy beliefs, teacher and pupil behaviors, and pupil achievement in high school basic skill mathematics and communications classes. Pupils in the classes were low achievers and it was expected that teachers' efficacy beliefs would have an impact on teacher behavior with these pupils. It was found that GTE beliefs, but not PTE beliefs, were significantly related to achievement in mathematics. Teachers' PTE beliefs, but not GTE beliefs were significantly related to language achievement (Ashton, 1985; Ashton & Webb, 1982; Ashton, Webb, & Doda, 1983). It was suggested that teachers' efficacy beliefs seemed to vary for different situations and there were several trends toward significance which indicated the linking of efficacy beliefs and teacher behavior. The data from the mathematics and language classes which compared the relationships between the two efficacy measures and classroom process variables were analyzed together and any specific subject matter findings were

obscured. The researchers emphasized the need to investigate subject specific relationships in the future (Ashton & Webb, 1986). It was also noted that the measures of efficacy based on two Likert-scale items may not have been an adequate representation of teachers' efficacy beliefs (Ashton, Webb, & Doda, 1983).

Ashton, Webb and Doda (1983) studied teachers with high and low efficacy belief scores through observation, interview and questionnaire techniques. They reported perceptual and behavioral differences between high and low efficacy teachers. High efficacy teachers tended to maintain high standards, monitor pupils' on-task behavior and build a friendly, warm climate with pupils. Low efficacy teachers tended to give preferential treatment according to pupil ability and found lower achieving pupils threatening. However, the classroom observations included a rating scale for student engagement, an instrument to measure instructional methods and a class climate instrument. No significant relationships were found between teacher beliefs and classroom behaviors.

Gibson and Dembo (1984) found that there were behavioral differences between teachers that affected pupil achievement. Anecdotal records indicated that pupils of low efficacy teachers spent much time off-task while in small group work situations while high efficacy teachers attained more pupil on-task behavior. Even

though observation instruments utilized by Gibson and Dembo (1984) did not empirically measure pupil use of time, the anecdotal records supported the research on teacher effectiveness which indicated that more effective teachers maintain higher rates of pupil engagement time. Observations of classroom teachers were conducted with a small sample of high and low efficacy teachers based upon responses to only sixteen items from the Teacher Efficacy Scale. The coding system used in the observations reflected allocated time rather than academically engaged time and did not measure pupil engagement rates (Gibson & Dembo, 1984). The data suggested that high efficacy teachers may achieve higher pupil engagement rates but further research is needed to determine the relationship between teacher efficacy beliefs, engagement rates and pupil achievement. There is also a need to examine process behaviors with systematic observation techniques rather than through rating scales or anecdotal records.

Research evidence suggested that the classroom behavior of high efficacy teachers was characteristic of effective teachers as described in process-product studies. They tended to maintain an academic orientation in instruction, a positive environment and were able to achieve more pupil on-task behavior. There was also evidence that teachers' efficacy beliefs related to pupil

achievement in the classroom. Empirical research on teachers' efficacy beliefs and pupil learning is needed.

Stimulated recall. Stimulated recall interview techniques have been useful for researching teacher thinking. Since explaining what teachers do as they are doing it is impossible in a typical classroom, Nespor, McCuller, and Campos (1984) argued that stimulated recall is the next best thing if done soon after the actual event. Stimulated recall is a term employed for an interview technique that uses a recording, either audio and/or visual, of a classroom activity to guide the interview (Nespor, McCuller, & Campos, 1984). A video- or audiotaped recording of an event is replayed and the interviewer assists the subject in recalling the thoughts that accompanied the overt behavior. The value of the data gathered through this technique is based on the assumption that subjects are able and willing to recall and articulate their thought processes accurately and completely (Tuckwell, 1980). Bloom (1953) found a high correlation between a subject's recall of an event and the accuracy of the recall of the conscious event. After a period of two days accuracy of recall was over 90%. Medical research using cross referencing of stimulated recall and thinking aloud data found that there was consistency in the data gathered by these methods (Elstein, Kagan, Shulman, Jason, & Loupe, 1972).

Procedures used for conducting stimulated recall interviews vary widely from one study to another. Researchers may pre-select segments of a tape for replaying or replay the entire tape. Pre-specified questions may be used when the tape is stopped or open-ended commentary by the subject may be allowed. The interviewer may control when the tape is stopped, the subject may decide when to stop the tape, or the decision may be shared by the subject and the researcher.

Tuckwell (1980) summarized some major practical considerations in order to maximize the accuracy and completeness with which a subject reports thoughts during stimulated recall interviews:

1. Rapport and familiarization must be established in a positive way by the interviewer. The interviewer should be perceived as an interested colleague in a non-evaluative role and the subject should be guaranteed anonymity. A period of familiarization with videotape equipment should be provided to lessen observer obtrusive effects and the tendency for subjects to focus on physical characteristics.

2. At the beginning of the interview a general conversation should establish a relaxed atmosphere. The interviewer should review the objectives of the study and outline the rationale for using the videotape to stimulate the reliving of the lesson and recall of

thoughts, feelings and reactions that were experienced during the lesson. The subject should be encouraged to identify stimulus points at which to stop the replay in order to recall thoughts. Remind the subject that the interviewer is to assist the recall and will not evaluate thoughts.

3. When tapes are transcribed, comments made by the interviewer and the subject should be separated and each transcript should be verified.

One physical education study reported the use of stimulated recall to investigate teacher planning and interactive decision making (Housner & Griffey, 1985). The physical education teachers viewed segments of a videotape of their own lesson and teachers responded to a structured interview with a pre-specified set of questions. Responses from eight experienced teachers and eight preservice teachers were audiotaped and coded by categories. The findings indicated that pupil behavior served as the antecedent of 85% of teachers' reported interactive decisions. Often it was a negative cue from pupils that resulted in teachers' interactive decisions to change their behavior. However, positive pupil cues resulted in changes of behavior more frequently for experienced teachers than for preservice teachers (30% - 6%). The suggestion was that teachers may differ

considerably in their perceptions of classroom events and this affected teaching behaviors elicited by teachers.

Research on teachers' thought processes has relied on self-reports such as thinking aloud, stimulated recall interview, critical incident esaay, or journal writing (Clark & Peterson, 1986; Nespor, McCuller, & Campos, 1984). Templin (1983) reported the use of triangulation of academic learning time in physical education with other methods of data collection to explain the teaching-learning process in physical education. The use of multiple methods to gather data may allow researchers to examine converging results on the same issue (Brophy, 1979; Nespor, McCuller, & Campos, 1984; Templin, 1983). Locke (1984) suggested that the use of multiple methods may lead to a more complete assessment of what is going on in physical education classes.

Stimulated recall techniques appear to be useful for the study of teachers' thoughts. Used in conjunction with systematic observation techniques, stimulated recall may offer the possibility of studying the influence of teachers' thoughts on observable actions. The use of stimulated recall techniques should be explored further in studies of physical education teachers' thoughts and actions.

Teachers' Actions and Observable Effects on Pupil Opportunity to Learn

Research on teacher effectiveness. Teacher effectiveness research addresses questions relating to what distinguishes more effective from less effective teachers. The process-product paradigm has served as a framework for much of the research on effective teaching where the relationships between measures of teacher classroom behaviors (processes) and measures of pupil learning outcomes (products) become the focus of inquiry (Brophy, 1979; Doyle, 1977; Dunkin & Biddle, 1974). Dunkin and Biddle (1974) described four broad categories of variables for consideration in classroom research: (a) presage variables include characteristics, attitudes, beliefs, expectations, and abilities of teachers and pupils; (b) context variables include grade level, subject matter, instructional objectives and other particulars of the setting or environment; (c) process variables are observable teacher and pupil behaviors; and (d) product variables are measures or indicators of outcomes, learning or achievement. Research has indicated that many processes which contribute to effective teaching and learning are consistently being identified (Brophy, 1979; Brophy & Good, 1986; Dunkin & Biddle, 1974; Good, 1983; Locke, 1984; Rosenshine & Furst, 1973). Teacher and pupil process behaviors

promote higher achievement under certain conditions (Soar & Soar, 1982).

Rosenshine and Furst (1973) recommended that the source of variables for study come from research in natural settings in the form of descriptive or correlation studies and that experimental studies further examine potential variables for causal relationships between teacher behaviors and pupil learning outcomes. With the increased use of systematic observation to study the relationship of the teaching process to pupil learning in natural settings some consistent trends that differentiate more effective and less effective teaching processes are appearing. However, there is still relatively little knowledge of which teaching process variables lead to which learning products.

Results of process-product research on teaching effectiveness have indicated that there are few universal principles of instruction or teaching behaviors that apply to all teaching situations (Brophy, 1979). However, the influence of context has become recognized as important and teachers must not only have certain capabilities but know how and when to use them appropriately (Dunkin & Biddle, 1974; Soar & Soar, 1982). Process-product research assumes that the teacher is an important, if not the most important, influence on pupil achievement and that teacher behaviors have a direct

impact on student outcomes (Doyle, 1977). The two factor structure of the process-product paradigm poses problems for researchers investigating the complex interactions among setting, learner and teaching processes. A variety of situational variables which influence teacher behaviors have been studied (e.g., class size, characteristics of students, subject matter) and results have indicated that context affects teachers' perceptions of their effectiveness (Cooper, Burger, & Seymour, 1979). Doyle (1977) suggested that a mediating process and classroom ecology paradigm can facilitate the integration of information from studies of teacher effectiveness.

The mediating process paradigm focuses upon the study of pupil learning outcomes as a function of mediating activities used by teachers and pupils in the learning process and assumes that pupils play an active role in determining what is learned (Doyle, 1977; Yerg, 1983, 1986). Many teacher effectiveness studies have incorporated measures of pupil process behaviors, such as time utilization, and have related these to context and outcomes. Attempts to attribute differences in learning to a few variables is difficult because of the variety of variables that potentially influence the outcome. Teacher effectiveness research should include contextual variables, overt process variables and the meanings and

thoughts that teachers and pupils assign to events that occur in the learning environment (Doyle, 1977).

The mediating process paradigm has been used for studies of pupil active learning time. The proposition is that active learning time influences achievement and is related to such variables as pupil background, teacher behaviors, teacher perceptions, pupil behaviors, instructional objectives and situational limitations. Research findings from studies in natural settings have consistently identified presage variables relating to teachers' role definitions and expectations and process variables relating to pupil successful engagement time in appropriate activities as being significantly related to pupil achievement (Brophy & Good, 1986; Fisher et al., 1981; Rosenshine, 1978). Pupil opportunity to learn has been identified consistently as a variable that influences effective teaching and pupil learning (Berliner, 1977; Graham & Heimerer, 1981; Rosenshine & Furst, 1973). This variable has been refined to distinguish between time allotted for an activity and pupil engagement time on criterion tasks (Berliner, 1977; Rosenshine, 1978). More recent definitions of student opportunity to learn include the concept of academic learning time which is measured when pupils are actively involved with criterion tasks at a high success rate

(Berliner, 1979; Fisher et al., 1981; Siedentop, Birdwell, & Metzler, 1979).

Research on teacher effectiveness in physical education. Research findings on teaching physical education have tended to support the findings from classroom research and similar implications for effective teaching practices have been made (Placek & Locke, 1986; Siedentop, 1984). The study of teaching in the gymnasium or activity setting has relied heavily on data gathered through the use of systematic observation instruments. In the early 1970's researchers adapted systems of analysis developed initially for classroom observation and applied them to physical education (Darst, Mancini, & Zakrajsek, 1982). Early physical education observation systems focused mainly on teacher verbal behavior. Later, pupil variables became the focus of physical education observation systems. Researchers felt that an examination of teacher variables alone would produce little useful information on which of these variables directly influenced pupil learning (Placek & Locke, 1986; Tousignant & Brunelle, 1982).

Teaching motor activities has much in common with instruction in other subject matter areas. However, movement plays an important role in the physical education setting and improved movement is often the major objective of teaching. The learner's success

depends upon the movement produced. To learn a motor skill the pupil must practice in a psychomotor mode and this overt practice lends itself to observation and measurement (Metzler, 1986b). It is not surprising to find researchers who study effective teaching in physical education concentrate on how pupils use their time in relation to involvement in active movement. It is difficult for a pupil to fake practicing a motor skill and this allows for systematic observation to become highly objective. Pupils use of time is considered to be one of the most powerful indicators of teacher effectiveness (Graham & Heimerer, 1981).

The measures of allocated time and pupil engagement time do not always distinguish between more or less effective teachers of physical education (Pieron, 1982b; Yerg, 1981b). However, the amount of criterion time-on-task has been found to distinguish more effective from less effective physical education teachers. Pupils from more effective teachers' classes spent more time actively engaged with the relevant task (Ashy, Lee, & Landin, 1988; Graham, Soares, & Harrington, 1983; Phillips & Carlisle, 1983; Pieron, 1982b, 1983a). Borys (1982) found that student teachers who received training on ways to increase the number of pupil practice occurrences, their duration and intensity, along with ways of reducing pupil time spent in waiting, were able to increase the

pupil motor engagement time much more than teachers who did not receive the same training. The technique or quality of practice appears to be more important than the number of practice trials (Ashy, Lee, & Landin, 1988).

Physical education studies have indicated that of the time devoted to physical education content, pupils are engaged with activities related to specific subject matter only half the time. The other proportion of pupil time is spent in non-engaged activities. Pupils generally spend up to one quarter of the engaged time in motor responses and most of these responses are at a high ratio of success. It has been observed that the rate of pupil engagement shows large differences according to the particular activity (Tousignant & Brunelle, 1982). Pupils in physical education have been found to modify the goals of tasks and participate at minimal levels (Tousignant & Brunelle, 1982; Tousignant & Siedentop, 1983).

A concern for the effects of teaching on pupil learning in physical education has led to the development and use of the Academic Learning Time in Physical Education (ALT-PE) observation instrument (Siedentop, Birdwell, & Metzler, 1979; Siedentop, Tousignant, & Parker, 1982). This instrument focuses on what pupils are doing and effective teaching is based upon the amount of time pupils are actively engaged in relevant motor

tasks with a high degree of success (ALT-PE(M)). The ALT-PE instrument is popular for research in physical education because it provides a measure of a process variable which has a strong relationship to learning (Placek & Locke, 1986; Rosenshine, 1978; Siedentop, Birdwell, & Metzler, 1979). Some researchers believe that ALT-PE(M) is a better indicator of pupil learning in physical education than achievement tests since achievement tests for complex skills are virtually nonexistent (Metzler, 1983b; Siedentop, 1983b).

In an extensive review of research on preservice teachers it has been noted that they

> "...can be caused to acquire particular teaching behaviors. What is less clear from the research is what impact particular teacher behaviors have on student achievement in the natural setting,...how well skills acquired in training programs transfer to the natural setting, and under what conditions teachers will persist in using the pedagogy they have acquired through formal teacher education" (Locke, 1984, p. 36).

Current research results from qualitative studies (Placek, 1983; Templin, 1983; Tousignant & Siedentop, 1983) and from descriptive studies on academic learning time in physical education (Metzler, 1985) suggested that physical education teachers often do not use the process skills relating to pupil engagement time on relevant tasks that they were taught in their preservice education. Although the socialization of teachers into the profession is thought to be a major influence on

student teachers (Schempp, 1983, 1985), it has also been suggested that preservice teachers have their own fixed ideas about teaching which screen out much of the information provided during professional preparation (Locke, 1984). There is need for further investigations on the influence of student teachers' perceptions to teaching behavior and pupil engagement time in physical education.

Engagement time and student opportunity to learn. Brophy and Good (1986) summarized the research based conclusions about teacher behaviors that maximize pupil achievement. They stated that the amount pupils learn is related to such things as: opportunity to learn, an emphasis on academic instruction, teachers who define their roles in terms of expecting mastery from their pupils, teachers who organize and manage the environment to maximize time on academic activities, and pupil engagement in activities at an appropriate level of difficulty which ensure high rates of success. However, it was found that many teacher behaviors that influenced pupil achievement were situation specific rather than generic.

Descriptive research into engagement time in physical education indicated that pupils spend approximately one third of their time engaged in motor activities (Costello & Laubach, 1978; Pieron & Hann,

1980). Student teachers have been reported to have pupils actively engaged less than master teachers for the teaching of gymnastic activities. Gymnastics lessons have usually had lower pupil time-on-task rating as compared to other activities (Costello & Laubach, 1978; McEwen & Graham, 1982; Metzler, 1980; Pieron, 1979, 1981, 1982a; Pieron & Cloes, 1981; Pieron & Hann, 1980; Rate, 1981; Whaley, 1980). The successful motor engagement time on relevant tasks was estimated at 10% in gymnastics and 35% in volleyball (Pieron, 1981). It has been observed that the motor responses at a high rate of success was lower for senior high school pupils when compared to elementary and junior high pupils (Metzler, 1980; Pieron & Cloes, 1981).

Unless the concept of engaged time is made very specific it does not represent opportunities to learn motor skills (Pieron, 1981). Engagement time must be defined in such a way as to reflect the criterion task to be learned (Pieron, 1983a). High success rate related to the outcome measures was identified as a necessary criterion for real learning to occur in the classroom (Berliner, 1979). ALT-PE(M) which includes only pupil engagement of motor responses at a high rate of success is considered to be an indicator of pupil opportunity to learn in physical education (Metzler, 1980, 1983b; Siedentop, Birdwell, & Metzler, 1979). The total amount

of active learning time on a specific motor skill seems to be an important determinant of pupil achievement at that motor skill (Pieron, 1983a, 1983b).

Engagement time is seen as a mediating link between teacher behavior and pupil outcomes. Engagement rates depend upon many variables including the teacher's ability to manage the class so that academic activities are conducted smoothly with brief transitions and little time is spent dealing with pupil off-task behavior (Brophy & Good, 1986). McEwen and Graham (1982) concluded that majority participation does not mean that pupils are actually making the most of the practice time to learn criterion skills. The amount of teacher skill related behavior (e.g., feedback) did not increase pupil learning time unless pupils were also practicing skills most of the class time. Increases in pupil practice occurrences were found to substantially influence the increase in pupil motor engagement time (Borys, 1982). The number of practice trials using correct technique were found to correlate with achievement (Ashy, Lee, & Landin, 1988).

Gibson and Dembo (1984) found that differences in pupil engagement rates may have varied according to high and low efficacy teachers. However, the coding system used in their study measured allocated time rather than academic engagement time. They recommended that further

research investigate the relationship of teachers' efficacy beliefs to pupil on-task engagement rates.

Pupil engagement time is an important concept for studies of process-product relationships in physical education. However, the concept of pupil use of time needs to be measured in relation to the criterion task to be learned and the context (e.g., grade, activity). Engagement time can be influenced by many variables. Variables that influence student teachers use of effective techniques to increase pupil motor engagement time have been identified as cooperating teacher influences, teaching style, pupil knowledge of subject matter, initial motor engagement level of pupil, amount of instruction, student teacher background and context in which teaching occurs (Borys, 1982). Researchers must be cognizant of the influence of these variables on pupil engagement time. Research designs should account for the influence of many variables upon pupil engagement rates.

Academic learning time in physical education. Teacher effectiveness studies in classroom settings have found pupil use of time as a mediating variable which correlates with pupil achievement (Berliner, 1977; Fisher et al., 1981; Lieberman, 1982). In particular, the importance of time spent by a pupil engaged in content related activities with a high rate of success has been linked to achievement gains (Fisher et al., 1981). The

concept of academic learning time distinguishes successful pupil engagement time on content tasks from time allotted by a teacher for activity and time (either successful or unsuccessful) spent by a pupil on an activity (Denham & Lieberman, 1980). Academic learning time is considered to be an "...observable measure of ongoing student learning...[and]...the accumulation of Academic Learning Time represents learning taking place and therefore, results in increased student achievement" (Fisher et al., 1981, p. 2). With the prediction that academic learning time influences pupil learning came a shift to examining process variables relating to learners rather than the teacher. Teacher behaviors are seen as mediating influences which affect the academic learning time of pupils (Denham & Lieberman, 1980).

The concept of academic learning time has been applied in physical education through the development of an observation instrument which is sensitive to how the learner uses time and whether the learner is engaged successfully with motor responses related to the subject matter (Metzler, 1982). In physical education academic learning time includes all responses, both cognitive and motor, in which a pupil engages at a high success rate. Motor academic learning time (ALT-PE(M)) refers only to motor responses at a high success rate.

When adequate measures of student achievement are unavailable in physical education, ALT-PE(M) can be seen as a substitute measure of achievement (Metzler, 1982). Thus, academic learning time in physical education has been viewed as an indicator of teaching effectiveness because it is a measure of pupil opportunity to acquire motor skills and knowledge (Siedentop, Birdwell, & Metzler, 1979). The underlying assumption is that improvement in ALT-PE(M) is related to improved pupil opportunity to learn which, in turn, affects achievement (Siedentop, Birdwell, & Metzler, 1979). Research conducted by Fisher et al., (1981) demonstrated that it is possible to substitute successful pupil time-on-task measures on relevant tasks for product measures of actual achievement. The resulting process-process paradigm is a viable means of investigating relationships between teacher and pupil behaviors and student outcomes in physical education (Siedentop, Birdwell, & Metzler, 1979; Siedentop, Tousignant, & Parker, 1982).

The academic learning time concept was first applied in physical education with the creation of the ALT-PE instrument (Siedentop, Birdwell, Metzler, 1979) and was later revised by Siedentop, Tousignant and Parker (1982). Initial studies centered on the development of the ALT-PE observation instrument (Metzler, 1980) and its validation through descriptive studies in a variety of contexts.

Some studies have attempted to use the process-process and process-product models (Dunkin & Biddle, 1974) to further build a knowledge base of teaching-learning processes in physical education. Correlation studies relating academic learning time and pupil achievement variables and a few experimental studies testing significant variables in controlled situations have been attempted.

The key to accurate and reliable measures of behavior change in physical education is in stating the conditions and criteria for which motor responses are to be considered successful (Alexander, 1983). While it is fairly easy to determine whether a pupil is motor engaged or not it may be difficult to define whether that engagement is appropriate as it depends upon the particular context. The instruments designed to study academic learning time in classroom research used content specific definitions that differed for reading or mathematics (Berliner, 1979). The "motor appropriate" category of the ALT-PE system is a generic category which allows for dissimilar responses to be included as long as they have a similar effect of producing success. For certain types of activities discrete trials per minute at an appropriate difficulty level produces similar information as measures of academic learning time and when discrete trials are hard to detect, the academic

learning time unit yields reliable data (Siedentop, Tousignant, & Parker, 1982). Coding conventions used for the motor appropriate category must be included in research reports to facilitate interpretation of academic learning time results from various physical education studies. Anderson (1983) suggested that the definition of what constitutes motor appropriate engagement activity is perhaps best done by the teachers in their own specific educational contexts. Researchers and teachers are cautioned about comparing academic learning time and motor academic learning time rates among various activities. Rather, comparisons should be made only for similar contexts (e.g., activity, grade, goal).

Metzler (1980) used the first ALT-PE instrument (Siedentop, Birdwell, & Metzler, 1979) to describe elementary and secondary pupils in physical education. The first phase of his study involved validation of the instrument with field testing, the development of a decision log for category definitions and achievement of inter-observer reliability. Observers completed a training course before the instrument was used in phase two of his study. Twenty one teachers and pupils from their classes in elementary, junior and senior high school were observed and data gathered to provide descriptive information.

It is interesting to note the variety of studies using the ALT-PE instruments since Metzler's (1980) validation study. Approximately half of the studies completed with the original version of the instrument were descriptive in nature whereas only a third of the studies using the second version have been descriptive studies. Researchers have attempted to describe pupil process behaviors at various school levels: elementary (Godbout, Brunelle, & Tousignant, 1983; Martinek & Karper, 1983; Metzler, 1980; Placek & Randall, 1986), secondary junior and senior high (Aufderheide, Olson, & Templin, 1980; Godbout, Brunelle, & Tousignant, 1983; Grant, 1983; Metzler, 1980), and college level (McKenzie, 1986; McKenzie, Clark, & McKenzie, 1984; Metzler, 1981, 1986a; Rate, 1981; Wuest, Mancini, Van der Mars, & Terrillion, 1986). Studies have described the behaviors for pupils with special needs (Aufderheide, Olson, & Templin, 1980). Other studies have examined pupil behaviors in lessons taught with different instructional strategies (McKenzie, Clark, & McKenzie, 1984; Metzler, 1986a). Research has also provided descriptions of behaviors of high and low expectancy pupils (Martinek & Karper, 1983), of pupils taught by physical education specialists or nonspecialists (Placek & Randall, 1986), of high and low skill level players (Wuest, Mancini, Van der Mars, & Terrillion, 1986), and compared boys and

girls (Placek, Silverman, Shute, Dodds, & Rife, 1981; Placek, Rife, & Silverman, 1982; Silverman, Dodds, Placek, Shute, & Rife, 1984). Although the research on academic learning time in physical education has been conducted in a variety of activity settings, only a few researchers reported separate analysis of pupil behaviors for specified activities (Grant, 1983; Metzler, 1981; McKenzie, 1986; McKenzie, Clark, & McKenzie, 1984; Rate, 1981; Wuest, Mancini, Van der Mars, & Terrillion, 1986). Unfortunately, many research reports either do not indicate what activities were observed or analyzed several activities together.

Some of the research completed with the ALT-PE instrument has involved the examination of the correlation between specified variables. There have been fewer correlation studies completed than descriptive studies. However, research has focused upon a search for variables that relate to academic learning time in physical education: teacher process behaviors (Dodds, 1983); pupil skill level (Silverman, 1982, 1985b; Silverman, Dodds, Placek, Shute, & Rife, 1984), type of practice (Silverman, 1985b), gender of pupil (Silverman, Dodds, Placek, Shute, & Rife, 1984), special needs and regular pupils (DePaepe, 1985; Silverman, Dodds, Placek, Shute, & Rife, 1984), pre- or inservice teachers (Young & Metzler, 1982), type of equipment or rules (Lawless,

1985), teacher burnout level (Mancini, Wuest, Clark, & Ridosh, 1983), impact of planning (Twardy & Yerg, 1987), beginning or senior student teachers (Paese, 1986), and physical education major or elementary education student teachers (Paese, 1985).

Other research studies have attempted to use quasi experimental or experimental designs to examine academic learning time in relation to pupil achievement. An experimental teaching unit (ETU) has been used by investigators as an attempt to eliminate confounding variable influence on academic learning time (Edwards, 1988; Metzler, 1983a; Metzler & Young, 1984; Young & Metzler, 1982; Paese, 1985, 1986). Single subject designs which focus upon the use of an intervention procedure with teachers in an attempt to alter pupil ALT-PE(M) rates have been used by researchers (Beamer, 1982; Birdwell, 1980; Hart, 1984; Mancini, Wuest, Vantine, & Clark, 1984; O'Sullivan, 1983; Paese, 1982; Ratliffe, 1986; Webster, 1987; Whaley, 1980; Wurzer, 1982).

The use of qualitative research methods in conjunction with the quantitative measure of ALT-PE(M) have enhanced the descriptions of which teacher and student process behaviors are influencing student academic learning time rates (Aufderheide, Olson, & Templin, 1980; Templin, 1983). Hart (1984) used teacher's logged concerns, stated lesson priorities and

accounts of teacher reactions to the study along with the quantitative measures.

The review of research completed with the ALT-PE instrument has indicated that a descriptive base of information on pupil behavior in a variety of physical education contexts is available. At this point in time the research focus is on determining which variables correlate with pupil academic learning time and how these variables can be manipulated to increase opportunity to learn in physical education.

Research results on academic learning time in physical education have indicated that learners in physical education are engaged in content activities approximately 80% of the time and in content general activity involvement about 20% of the time (Dodds, 1983; Godbout, Brunelle, & Tousignant, 1983; Grant, 1983; McKenzie, Clark, & McKenzie, 1984; Metzler, 1980, 1981, 1986a; Rate, 1981; Silverman, Dodds, Placek, Shute, & Rife, 1984). The pupil motor engaged time may be quite low because of negative influences such as time spent on: content general activities (Godbout, Brunelle, & Tousignant, 1983; Rife, Shute, & Dodds, 1985; Wurzer, 1983), non-engaged time (Birdwell, 1980; Godbout, Brunelle, & Tousignant, 1983; Hart, 1984; Mancini, Wuest, Clark, & Ridosh, 1983; McKenzie, 1986; Paese, 1985, 1986; Ratliffe, 1986; Silverman, 1982, 1983, 1985a, 1985b;

Twardy & Yerg, 1987; Wuest, Mancini, Van der Mars, & Terrillion, 1986; Wurzer, 1982), cognitive engaged time (Metzler, 1986; Paese, 1986; Rife, Shute, & Dodds, 1985; Silverman, 1982, 1983, 1985a, 1985b; Wurzer, 1983), and time spent on management or interim activities (Birdwell, 1980; Hart, 1984; Mancini, Wuest, Clark, & Ridosh, 1983; McKenzie, 1986; Paese, 1985, 1986; Ratliffe, 1986; Silverman, Dodds, Placek, Shute, & Rife, 1984). Research has indicated that student activities involving waiting or transition, knowledge focus and non-engaged activity time tend to decrease the amount of ALT-PE(M).

A majority of the studies investigating academic learning time in physical education have been conducted with inservice teachers or college level instructors and very few have included preservice teachers (Metzler & Young, 1984; Paese, 1982, 1985, 1986; Twardy & Yerg, 1987; Young & Metzler, 1982). A study of the relationship of planning with inclass teacher and pupil behaviors suggested that planning is significantly related to ALT-PE(M) (Twardy & Yerg, 1987). Supervisor intervention has been successful in helping student teachers increase ALT-PE(M) rates (Paese, 1982). Also, student teachers who were in the early stages of their program had higher pupil engagement rates (Paese, 1985, 1986). ALT-PE(M) has been found to be related to achievement in lessons taught by student teachers (Young

& Metzler, 1982). When physical education specialist and non-specialist teachers were compared there were no significant differences found in pupil ALT-PE(M) rates (Placek & Randall, 1986). The information gained from teacher effectiveness research is being used in teacher training programs and student teachers in physical education are expected to use effective teaching behaviors in their student teaching experiences (Metzler, 1986b; Siedentop, 1981).

There are relatively few studies that examine ALT-PE(M) for senior high school students (Birdwell, 1980; Godbout, Brunelle, & Tousignant, 1983; Mancini, Wuest, Clark, & Ridosh, 1983; Mancini, Wuest, Vantine, & Clark, 1984; Metzler, 1980; Paese, 1982; Twardy & Yerg, 1987; Webster, 1987; Whaley, 1980). Studies at the secondary school level have reported that the level of teacher burnout correlates with the amount of pupil ALT-PE(M) (Mancini, Wuest, Clark, & Ridosh, 1983). Research indicates that teacher behavior can be changed to improve ALT-PE(M) rates of secondary school pupils (Birdwell, 1980; Mancini, Wuest, Vantine, & Clark, 1984). Student teacher planning strategies have been found to influence the amount of ALT-PE(M) for senior high school pupils (Twardy & Yerg, 1987). Only one study reported that an intervention treatment was not effective in affecting the ALT-PE(M) of secondary school pupils (Whaley, 1980).

There have been significant differences in ALT-PE(M) rates at various grade levels. One study reported significant differences in ALT-PE(M) rates in favor of secondary school students as compared to elementary pupils (Godbout, Brunelle, & Tousignant, 1983). However, Metzler (1980) reported that ALT-PE(M) rates for high school pupils were lower than for elementary school pupils. Rate (1981) reported that ALT-PE(M) rates were higher for secondary school athletic teams in a coaching context than for physical education classes. Thus, the contextual element of grade level appears to affect pupil academic learning time rates in different ways and there is considerable variation noted in research studies at the senior high school level in conjunction with other variables studied. Since approximately 75% of the studies on ALT-PE(M) rates have been conducted with grade levels other than senior high there is a need for further study at the senior high school level.

Few research reports have provided information on the ALT-PE(M) rates for gymnastic activities separate from other activities included in the study. In light of the lack of specific reports for academic learning time for gymnastic lessons, it is difficult to determine acceptable pupil rates for this specific activity. The engagement time of students in gymnastic activities have been reported as low in comparison to other activities

(Aufderheide, McKenzie, & Knowles, 1982; DePaepe, 1985; Grant, 1983; Metzler, 1980; Rate, 1981). DePaepe (1985) found that mentally retarded pupils improved balance skills significantly in conjunction with increases in ALT-PE(M) rates of students. Regular and mainstreamed pupils have been found to have similar engagement rates in gymnastic lessons but the regular pupils achieved more motor successes (Aufderheide, McKenzie, & Knowles, 1982). As much as twice the amount of waiting time has been reported in gymnastic activities as compared to other activities (Grant, 1983). There is considerable difference in ALT-PE(M) reported in favor of athletic gymnastic team practices as compared to physical education classes (Rate, 1981). With very low ALT-PE(M) times reported for pupils in gymnastic activities researchers should consider this activity as a contextual focus for further study.

Only two known studies have reported the examination of teacher perceptions in relation to ALT-PE(M). Martinek and Karper (1983) found that high expectancy pupils demonstrated higher amounts of ALT-PE(M) rates than low expectancy pupils and the teacher provided more subject matter knowledge to high expectancy pupils. Low expectancy pupils were found to exhibit three times as much inappropriate motor responses. Metzler and Reif (1986) found no relationship between teachers' efficacy

beliefs and their behaviors influencing pupil ALT-PE(M). Since teacher effectiveness research indicates that teacher expectations influence teacher process behaviors which affect learning (Brophy & Good, 1986) there is a need for further research on teacher perceptions and academic learning time in physical education.

An experimental teaching unit - lesson objective. In order to study the teaching-learning interaction, teaching must be defined so that variables can be measured and at the same time be limited so that the analysis is credible. Researchers examining theoretical constructs need to study a specific context and observe the most pertinent factors. The variables must lend themselves to meaningful measurement within the context. In an attempt to examine variables in a controlled situation which allows for some manipulation of variables, researchers have made use of an experimental teaching unit (ETU). An ETU is a series of lessons on a topic appropriate for pupils. The standardized unit of instruction usually consists of pre- and post-tests and stated objectives (Pieron & Graham, 1984). The instructional task is often novel for the subjects in order to reduce prior learning effects. Teachers usually can choose instructional strategies although dictating the pattern of teaching may be used for certain research purposes. With the use of the ETU the researcher

attempts to estimate the amount of influence of certain variables on the pupil's final performance. The subject matter is the same for all groups and environmental conditions are also standardized as much as possible.

In physical education the mini or modified ETU has been used where a single lesson is standardized for teachers (Ashy, Lee, & Landin, 1988; Graham, Soares, & Harrington, 1983; Metzler, 1983c; Pieron, 1982b; Pieron & Graham, 1984; Yerg, 1980, 1981b; Young & Metzler, 1982). Student teachers have been studied as they teach various gymnastic skills: cartwheel (Yerg, 1980, 1981b), handstand-roll-over (Pieron, 1982b), and balance beam skills (Yerg & Twardy, 1982). A novel hockey-golf games-like skill has been used by teachers (Edwards, 1988; Graham, Soares, & Harrington, 1983; Metzler, 1983c). A soccer skill has also been used in an ETU (Ashy, Lee, & Landin, 1988).

Metzler (1983c) analyzed data from an ETU study and found that ALT-PE(M) does affect learning gains even if the amount is modest. The setting of specific standards resulted in higher ALT-PE(M) for a floor hockey-type skill (Edwards, 1988). Pupil entry skill level has been found to be a powerful indicator of post-test achievement and pupils who performed more criterion skills performed better (Yerg, 1980, 1981b). In a soccer ETU the number of practice trials using correct technique has been found

to correlate with pupil achievement (Ashy, Lee, & Landin, 1988). Metzler (1983c) reported that the instructional task needs to be sensitive to real differences in pupil achievement scores and that if the task is too easy, differences in scores may not emerge between students. With a task that is too easy, once a student accrues enough academic learning time minutes necessary to achieve the task, additional time would no longer discriminate that student from others (Metzler, 1983c). The potential ceiling effect must be considered by researchers who use an ETU.

The ETU appears to be a means of conducting research in physical education to determine which variables influence pupil achievement. Although limited in number, the studies to date that use ETU procedures have indicated that the engagement variable of ALT-PE(M) is not only correlated with pupil achievement, but is a strong predictor of pupil achievement. This trend supports educational research which indicated that the pupil variable of ALT-PE(M) is positively correlated with achievement (Waxman & Walberg, 1982). With further research using ETU procedures it may be possible to determine more accurately how much ALT-PE(M) is needed in order for pupils to learn various skills. It may also be possible to investigate more closely the variables which

significantly influence ALT-PE(M) and pupil opportunity to learn in physical education lessons.

Student opportunity to learn gymnastic skills. Research reports have provided some indication that pupil opportunity to learn gymnastic skills is limited because ALT-PE(M) rates during gymnastic activities is lower than for other activities. Some researchers caution that opportunity to learn in gymnastics may be primarily related to pupil use of time rather than teacher effectiveness per se. Yerg (1980, 1981b) found that teacher behavior was not a significant factor in improved performance of pupils in a cartwheel skill. Yerg (1981b) also reported that the teacher's knowledge of the task was not a discriminating factor in determining more or less effective teachers. The group of pupils performing more criterion tasks were the ones who performed better in gymnastics. Yerg and Twardy (1982) also reported that teacher behavior was not significant in pupil achievement of balance beam skills. However, they reported that teachers who were less knowledgeable about the skill provided less feedback during practice and may have hindered achievement by remaining silent.

Research has provided evidence that high achieving pupils in gymnastics tend to find more opportunities to practice relevant skills with success than low achieving pupils (Pieron, 1982a; Shute, Dodds, Placek, Rife, &

Silverman, 1982). It was also found that high achievers had much less wait time and the success rate was considerably different for high achievers than for low achievers. Pieron (1982a) reported that even though the engagement rates were different for high and low achievers, teachers behaved much the same toward the groups.

Pieron (1982b, 1983a) used an ETU to study variables relating to pupil achievement in gymnastic skills. The ETU objective was stated in such a way as to allow teachers freedom of choice in teaching strategies, management and organization techniques. However, teachers were to do what they could in order to help pupils make maximum learning gains in the skill. The ETU consisted of five lessons in which the teacher was free to select the objective for the unit. These studies indicated that the closer the activity was to the criterion task, the more pupils achieved. The pupil success rate was considered to be an indicator of effective accommodation of task to learner needs.

In order for pupils to learn gymnastic skills it appears that most of the learning time must be related to activities that are directly related to the criterion task. Teacher behaviors that accomplish this type of activity for pupils would be more effective in achieving goals. Although teacher behaviors do not seem to have a

direct impact on the pupil achievement it appears that teacher choice of activities and attempts to keep pupils engaged on relevant tasks for most of the lesson will be more effective. Also, teachers must be aware of pupil success and select activities that afford pupils as much ALT-PE(M) as possible during a lesson in order to be effective in their teaching. The use of the ETU may help to determine more precisely which teacher behaviors lead to the most ALT-PE(M) rates in gymnastic lessons.

Direction for Further Research

The study of the relationships among variables can be made more meaningful through the use of a model in which components of the teaching-learning environment are presented in theoretical combinations. Yerg (1986) presented a model which includes components of the presage, process and product variables as described by Dunkin and Biddle (1974) that operate together to produce the learning situation. See Figure 4. The suggested use of the model is for the study of selected combinations of variables from the components.

The research findings on teachers' thoughts and actions lead to the suggestion that studies should investigate selected presage variables in relation to influences on process and product components. It is clear from teacher effectiveness research that learner

Figure 4 is omitted because of the unavailability of copyright permission. See Yerg, B. (1986). Research on teaching in physical education: An interactive model in operation. In M. Pieron & G. Graham (Eds.), Sport pedagogy. Champaign, IL: Human Kinetics Publishers, Inc., p. 51.

behavior affects outcome and one pupil process variable which is critical to learning has been identified as ALT-PE(M). Teacher behaviors that facilitate or inhibit ALT-PE(M) should also be identified. Since research has indicated that teacher behavior is influenced by presage variables dealing with perceptions, expectations and sense of teaching efficacy beliefs, then researchers should include the investigation of these presage variables in conjunction with the process variables which are known to influence the product. By expanding the research paradigm from process-product or process-process to presage-process-product, researchers may be better able to explain why certain variables influence the outcome. Also, the complexity of teaching may be better addressed with the expanded paradigm.

It is suggested from current research on teachers' thoughts and perceptions that teachers' sense of teaching efficacy may be a critical presage variable for study. It has been shown from classroom research that teachers'

efficacy beliefs are correlated highly with pupil achievement for cognitive tasks. Only one known pilot study examined sense of teaching efficacy in physical education where the focus of teaching is on motor skill learning (Metzler & Reif, 1986). The research on teacher expectations of pupils lends support for the notion that teacher beliefs correlate highly with pupil outcomes. The research findings on physical education teachers' concerns and perceptions of effective teaching are disturbing in that physical education teachers appear to have the perception that pupil learning is not an important outcome of the teaching-learning environment. It is not known what the extent of the influence of perceptions is on pupil performance in physical education.

The research on teaching in physical education has indicated that pupil ALT-PE(M) is a critical process variable which influences achievement. ALT-PE(M) has been used as an indicator of opportunity to learn in physical education settings where measuring learning outcomes for complex skills is difficult. Achievement tests for complex skills in physical education are not available. Most of the research on ALT-PE(M) has been conducted with inservice teachers in natural settings. There is the need to investigate the ALT-PE(M) with student teachers. Teacher behaviors relating to ALT-

PE(M) can be caused to change through intervention procedures but it is not known if student teacher behaviors can be effectively changed and if the changes transfer to the natural setting.

It appears that pupil opportunity to learn gymnastic skills may be limited due to reported low ALT-PE(M) rates. The suggestion from research is that the context of the gymnastic activity setting and the learning products for gymnastics pose special problems for teachers. Very little information is available regarding variables that influence the pupil ALT-PE(M) rates in gymnastics other than practice on the criterion task. There are no studies in physical education which investigate the beliefs of teachers in relation to process variables in the teaching of gymnastics. Based on the research findings there is the need for an investigation of physical education student teachers' presage beliefs in relation to process and product variables. Teachers' sense of teaching efficacy and ALT-PE(M) may be related in critically important ways that affect pupil learning of motor skills. Studies which control for subject matter, grade level and teaching experience of teachers may help to provide further evidence of the importance of presage and process variables and their influence on product.

This study used the presage-process-product paradigm. The presage variable of teachers' sense of teaching efficacy was correlated with pupil ALT-PE(M) in gymnastics lessons. Context variables were held constant through the use of an experimental lesson objective. Student teachers who taught senior high lessons were the subjects for this study. In the absence of achievement tests in physical education, the ALT-PE(M) rates were used as indicators of learning taking place. Other process variables were examined in relation to presage variables. The Yerg (1986) model for research in physical education was used for the design of this presage-process-product study which examined the influence of variables suspected of influencing learning opportunities in physical education contexts (see Figure 5.).

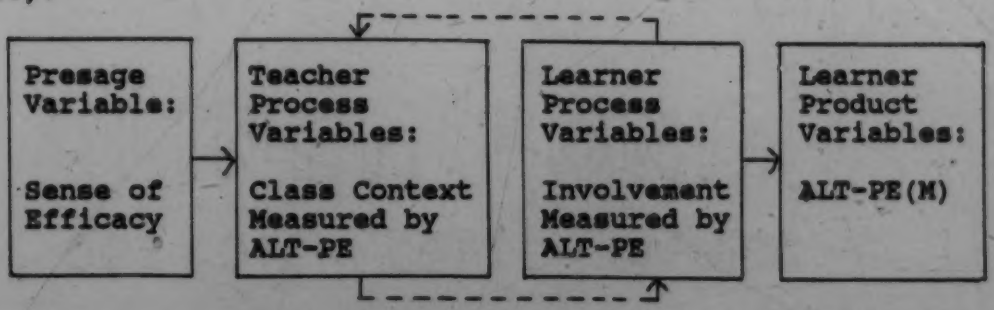

Figure 5. A Model of a Presage-Process-Product Study in Physical Education.

CHAPTER THREE

THE STUDY

Introduction

This study examined the relationship of student teachers' sense of teaching efficacy with behaviors occurring during teaching that influence pupils' opportunity to achieve a specific motor skill objective in a physical education lesson. The dependent variable was either the amount of time pupils spent actively engaged on relevant motor tasks (motor engaged time) or the amount of time pupils spent on motor tasks with a high degree of success (ALT-PE(M)). The independent variables included student teachers' sense of teaching efficacy in relation to the teaching of a specified lesson objective and included measures of personal teaching efficacy (PTE) and general teaching efficacy (GTE). Other independent variables included presage and context variables such as age, gender, type of program, course work completed, teaching experience and class size. Several theoretical hypotheses have been formulated relating teaching efficacy beliefs and pupil achievement. The following hypotheses have been examined in this study. In theory, teachers' PTE should correlate positively with pupil motor engagement or ALT-PE(M) rates. In order for their pupils to achieve a motor objective, teachers with higher PTE beliefs should

provide more relevant and successful learning opportunities in relation to the goal. The assumption underlying this positive relationship is that when pupils achieve the motor learning objective it is, in part, because of the teachers' ability to establish opportunities for pupils to learn. However, GTE beliefs regarding the ability of teachers to overcome constraints to bring about pupil learning should correlate negatively with pupil motor engagement or ALT-PE(M) rates. The teachers' belief that they cannot overcome environmental conditions to help pupils achieve the goal may be reflected in lower pupil engagement rates leading to fewer opportunities to learn motor skills. If teaching efficacy beliefs are related to pupil engagement rates then PI and GTE beliefs may be useful predictors of pupil opportunities to learn in physical education lessons. This chapter describes the sample, the experimental lesson objective, design, variables, the instruments and procedures for data collection, and statistical methods used in analyzing the data.

Sample

The population from which the sample was taken consisted of all the students from the University of Alberta who were enrolled in the Secondary Route in the Faculty of Education with a major in Physical Education

and who are involved in a student teaching field experience at the high school level during Phase III, Term II (Winter, 1987), of their Professional Term. These student teachers spent the first four weeks of their term in curriculum and instruction courses on campus. This was followed by four weeks of full-day practicum experiences at the junior high school level, two more weeks of courses on campus and the term ended with four weeks of full-day practicum experiences at the high school level. There were approximately 50 student teachers registered in the program.

Thirty student teachers who were doing their high school field experience in the city of Edmonton and vicinity voluntarily participated in the study (see Appendix A for Consent Form). The student teachers had completed course work dealing with curriculum and instruction for secondary school physical education immediately prior to the high school field experience. Thus, the student teachers had discussed and practiced a variety of techniques and teaching methods in relation to a variety of physical activities. They also had completed a field experience at the junior high school level. Through concurrent experiences involving curriculum and instruction and practicum teaching it was assumed that the student teachers in the sample were familiar with process behaviors that influence pupil

opportunities to learn. For example, class management and organization for optimum student engagement time were topics that had been dealt with in classes and experienced during the junior high school field experience.

The sample of student teachers was composed of twelve females and eighteen males (n=30). The range in age was from 21 years to 42 years with a mean of 23.9 and a median of 23 years. Eleven student teachers had previously received a Bachelor of Physical Education Degree. Eight student teachers had not received credit for a gymnastics course taken at the university level. Of the twenty two student teachers who had taken a gymnastics course, seven indicated their course was focused on Educational Gymnastics and fifteen indicated their course focused on Artistic Gymnastics. Eighteen of the student teachers had not had experience instructing gymnastics. However, twelve student teachers indicated they had some experience teaching gymnastics during previous student teaching practicums. Only four student teachers had personal participation experiences in gymnastics beyond their own secondary school or university course work experiences. Figure 6 summarizes the background data obtained for the sample.

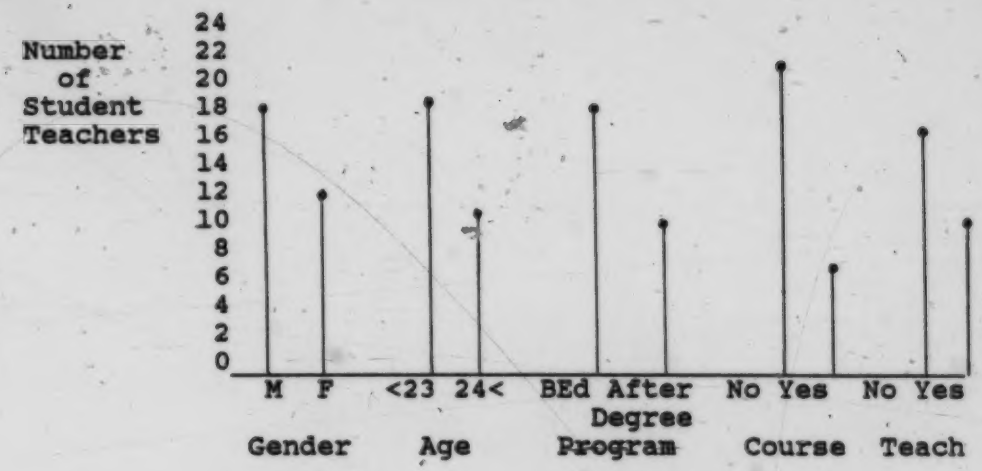

Figure 6. Background Information Variables for Sample (n=30).

The researcher met with each of the cooperating teachers in the seventeen high schools to which student teachers were assigned. Cooperating teachers were informed that the research project had received the approval of the school system involved. The study was briefly explained and a date was established for the student teacher to teach the experimental lesson. The cooperating teacher was provided with pupil consent forms to be distributed to pupils who were to be videotaped in the lesson (see Appendix B). Thus, all pupils came from intact classes that the student teachers would be teaching during their field experience. Of all thirty classes, twenty five were grade 10, four were grade 11, and one was a grade 12 physical education class. The average class size ranged from 10 to 30 pupils with a mean of 19.5 pupils and a median of 19 pupils per class.

Design

This study was designed as descriptive with the use of an ETU to provide some control of variables. The sample included all physical education student teachers who were involved in a high school practicum experience in their senior year in the City of Edmonton and vicinity. Intact classes of pupils were used and student teachers taught the classes they had been assigned to teach during their practicum experience. The instructional episode was videotaped and behaviors were coded from the videotapes by three trained observers. Pupils were not pretested or posttested but behaviors occurring during lessons were used to determine the effectiveness of student teachers in achieving the experimental lesson objective.

Quantitative data was collected prior to the instructional episode with the use of questionnaires and after the episode through the use of videotapes. Qualitative data was gathered as a result of interviews which were conducted following the instructional episode.

The design of the study was based on a model which suggests that some presage variables may be related to process variables which influence pupil learning. This study attempted to describe the relationships between selected presage and process variables in relation to a

specific experimental lesson objective for physical education.

The Experimental Lesson Objective

The pilot edition of the Secondary Physical Education Curriculum (1987) for the province of Alberta states that students in secondary schools should build upon movement experiences from the elementary grades and should have opportunities to develop motor skills, knowledge and appreciation and be able to apply these to a variety of activities (p. 1). Seven groupings of activities are identified as program dimensions and all seven are desirable for a balanced program. One of these dimensions consists of gymnastic activities which emphasize "body management skills for developing strength, flexibility and fluency of movement" (Secondary Physical Education Curriculum, 1987, p. 14). Several objectives have been identified for the development of knowledge, attitudes, physical and social skills through gymnastic activities. For the purposes of this study a single lesson objective stressed the physical or motor skill development of pupils in a gymnastic activity. The lesson objective aim was to develop in each pupil "...the ability to demonstrate mechanical principles and motor patterns in the creation and performance of olympic/rhythmic/educational gymnastics sequences both on

the floor and in formal/informal equipment arrangements..." (Secondary Physical Education Curriculum, 1987, p. 20).

The experimental lesson objective focused upon the theme of body rotations about the vertical, sagittal and horizontal axis (Secondary Physical Education Curriculum, 1987, p. 162). The statement of the objective allowed student teachers to teach the same objective in differing environments (e.g., schools) and to different skill levels of pupils. The emphasis was placed on the performance of a variety of motor skills relating to the theme. The instructional objective was designed to be within the scope of the normal secondary school physical education curriculum.

The experimental teaching lesson objective used by all student teachers was stated as follows:

> The students will demonstrate a sequence of movements which combines a variety of forward and backward rolls, cartwheeling actions and turns in such a way as to produce a smooth flowing sequence of movement from start to finish. The students must demonstrate that the actions performed in the sequence show three different types of rotations around the three axes of rotation: the vertical, sagittal and horizontal.

Student teachers developed a lesson relating to this theme and were allowed to select a form of gymnastics (i.e., educational, artistic, rhythmic) and teaching strategies such that pupils would accomplish the lesson objective. Likewise, the student teachers planned the lesson with or without apparatus according to what was available and appropriate for the pupils. In planning the lesson student teachers were to account for the "...organization and management of the time, space, equipment, learning activities and the students to be taught..." (Secondary Physical Education Curriculum, 1987, p. 30). Each student teacher needed to take into consideration the context for which they would be teaching the lesson.

The lesson objective was made clear to the student teachers prior to their practicum placement and they were told when they would be teaching the lesson as soon as they knew about their placement in a school. The student teachers were asked to plan the lesson by themselves with minimal assistance from the cooperating teacher. The researcher was available to provide resource information on the lesson objective, if requested, in order to facilitate student teachers' knowledge of the theme. None of the student teachers requested assistance from the researcher.

Variables and Instruments for Data Collection

This study examined the relationship among presage variables for student teachers, the class size context variable and process behaviors that occurred during the teaching of the experimental lesson objective. The model used to study these relationships included a criterion variable indicating student teacher effectiveness and a set of independent variables having theoretical relationships with the criterion variable. The criterion variable was pupil motor engagement time and, more specifically, pupil ALT-PE(M). The independent variables were: (1) student teachers' teaching efficacy beliefs, specifically GTE and PTE beliefs; (2) presage variables, and (3) a context variable of class size.

Dependent variable and ALT-PE coding system. The dependent variable was a measure of pupil engagement time in motor activities related to the experimental lesson objective. For a more stringent analysis of pupils' opportunities to learn in the experimental lesson, a measure of pupils' successful engagement time in motor activities related to the experimental lesson objective was also used. Thus, for statistical analysis the dependent variable used in this study was either pupil motor engagement time or pupil ALT-PE(M) time.

The concept of academic learning time in physical education drew its roots from instructional models in

which one important variable in the teaching-learning process is focused upon -- time, or more specifically, time-on-task. The second version of the ALT-PE instrument uses two decision levels (Context and Learner Involvement) (Siedentop, Tousignant, & Parker, 1982). The ALT-PE instrument involves a group focused context decision and an individual learner involvement decision for each observation interval (Siedentop, Tousignant, & Parker, 1982). The intervals in which the first decision (class context) is a subject matter motor category and the second decision (individual learner) is a motor engaged category represent intervals of motor engagement time. When the second decision is specifically motor appropriate then the interval represents ALT-PE(M). Thus, ALT-PE(M) occurs when the pupil is engaged in a subject matter motor activity that is also highly successful (appropriate). Motor behavior is categorized as appropriate or inappropriate in accordance with the learning task (Siedentop, Tousignant, & Parker, 1982). Note Appendix C for descriptions of the ALT-PE instrument categories with the decision log and observation coding sheet used for this study.

Interval recording is used for the ALT-PE instrument where an individual or group is observed for 6 seconds followed by a 6 second record phase in which behavior is categorized. Thus, many samples of behavior are

collected over time. The interval system provides highly reliable data through the use of short intervals spread evenly across the available time. Typically, three pupils are selected for observation and the first interval would focus upon the first pupil, the second interval would focus on the second pupil, the third interval would focus on the third pupil, the fourth interval would focus on the first pupil again, and so on. A six second observation followed by a six second record procedure for each interval has been used successfully with trained observers (Siedentop, Tousignant, & Parker, 1982).

Three trained observers were used for the purposes of this study. They were trained by the researcher through the use of the coding manual and procedures established for the ALT-PE instrument and with videotape segments collected during a pilot study involving student teachers, pupils, and a lesson similar to those used in this study. Each videotape had the audio cues for observe and record dubbed onto one sound track and had the student teacher's voice recorded on a second sound track. Both sound channels could be heard simultaneously. Thus, replaying of videotapes allowed for review of precise segments each time (Siedentop, Tousignant, & Parker, 1982). The scored-interval method of calculating reliability of coders was be used prior to

and during the coding of videotapes (Hawkins & Dotson, 1975). This method allows for establishment of reliability by category. Percentages higher than 80% were required for motor engagement and ALT-PE(M) categories for data collection to proceed.

Independent variables and the teacher efficacy scale. One set of independent variables used in this study included the presage and context variables discussed in the previous section on background information for the sample of student teachers. These variables were included in the analysis because of their theoretical relationship to teachers' sense of teaching efficacy beliefs (Ashton, 1985; Ashton & Webb, 1982, 1986; Ashton, Webb, & Doda, 1983).

The presage variables composing student teachers' sense of teaching efficacy were GTE and PTE beliefs. A thirty item Teacher Efficacy Scale (Gibson & Dembo, 1984) was used to determine student teachers' GTE and PTE belief scores. Interviews were conducted with eight of the student teachers from the sample. The interview questions were developed from items on the Teacher Efficacy Scale (Gibson & Dembo, 1984).

The development of the Teacher Efficacy Scale (Gibson & Dembo, 1984) stemmed from pilot work based on teacher interviews and reported characteristics of efficacious teachers (Gibson & Brown, 1982). A 53 item

scale was developed and tested for validity and reliability. The results of factor analysis, elimination of items with poor variability and clarification of ambiguities produced a revised 30 item scale in a six choice Likert format. This revised instrument was further tested with teachers to determine the dimensions of teacher efficacy, the extent that efficacy can be differentiated from other constructs and to observe the differential patterns of teacher behavior resulting from high and low efficacy teachers (Gibson & Dembo, 1984). Classroom observation data indicated that teacher efficacy may influence patterns of behavior known to yield achievement gains and the researchers suggested the need to examine the relationship between teachers' sense of efficacy and observable classroom process variables relating to student engagement and on-task behaviors (Gibson & Dembo, 1984). The Teacher Efficacy Scale (Gibson & Dembo, 1984) requires respondents to indicate the degree to which they agree or disagree with each statement. The choice of answer is based upon a six point Likert scale ranging from strongly disagree to strongly agree. The scale can be easily administered and takes approximately fifteen minutes to complete.

The Teacher Efficacy Scale (Gibson & Dembo, 1984) was used in this study, however, only the sixteen items identified by Gibson and Dembo (1984) as most reliable

were used for final data analysis. The scale has been adapted for use by physical education teachers through minor alterations in wording (Metzler & Reif, 1986). See Appendix D for the adapted instrument for physical education (Metzler & Reif, 1986). Items 1, 12, 14, 15, 19, 21, 24, 25 and 29 were used to tabulate a raw score out of a possible 54 for PTE beliefs. Items 2, 4, 6, 16, 23, 27 and 30 were used to tabulate a raw score out of a possible 42 for GTE beliefs.

For the purposes of this study the scale was administered in conjunction with an explanation of the experimental lesson objective. The objective was explained immediately prior to administering the scale. Since teachers' sense of efficacy is situation specific (Bandura, 1977) it was hoped that the specific objective would help respondents focus their thoughts about their beliefs to a particular context.

Videotape recordings of each of their lessons were shown to eight subjects in order to stimulate their recall of thoughts and events that occurred during the lesson. The student teacher and an interviewer viewed the videotape together as soon after the teaching of the lesson as possible. The interviewer's role was to assist the student teacher in recalling thoughts and feelings and no evaluative feedback was provided.

The stimulated recall interview questions asked student teachers to identify successes and difficulties in relation to their own lesson. The interviewer probed for explanations of why the student teacher felt the particular instance was successful or not and what influences were operating at the time. Audiotapes of the interviews were made and transcribed for data analysis.

Procedures for Data Collection

This study required three distinct procedures for data collection. One procedure involved the use of the Teacher Efficacy Scale (Gibson & Dembo, 1984) in which subjects responded to a six point Likert scale thirty item questionnaire. A second procedure involved the videotaping of lessons taught by student teachers and the coding of pupil behaviors during those lessons. The third procedure involved the use of the videotaped lesson for stimulated recall interviews. These procedures were conducted during three phases of the data collection. Phase one involved the administration of the Teacher Efficacy Scale (Gibson & Dembo, 1984) and the selection of student teachers for the sample. Phase two involved the videotaping of lessons taught by student teachers and stimulated recall interviews with selected subjects. Phase three involved the training of observers in the use of the ALT-PE instrument (Siedentop, Tousignant, &

Parker, 1982) followed by the coding of videotaped lessons.

During phase one the researcher met the entire group of student teachers approximately one week before the field experience in the high school was to begin (March 2 to 13, 1987). The researcher provided a brief explanation of the study indicating the purpose and involvement of volunteer student teachers. Student teachers were informed that the purpose of the study was to examine the relationship of the student teacher's thoughts about their own ability to teach a specific activity and the pupil behavior during a lesson based on that activity. Student teachers were told that their own involvement in the study would be to complete a questionnaire which would take about 15 minutes and, if selected, to teach a single lesson on a specific activity during their high school field experience. They were informed that the lesson would be videotaped so that pupil behaviors could be coded at a later time. Details of the specific instruments to be used and specific variables being examined were not given. Student teachers were assured that the cooperating teacher in the school would be informed about the study and would also have agreed to the student teacher teaching the lesson. They were also told that some student teachers would also be asked to participate in an interview while reviewing

the videotape with the researcher. The researcher provided student teachers with a brief explanation of the specific lesson objective to be taught. Student teachers were told that preparation for the lesson would be up to them but the researcher would provide resource information for any student teacher that so wished. The cooperating teacher was asked to provide minimal assistance to the student teacher in the planning of the lesson and student teachers were told that the lesson plan itself would not be evaluated by the researcher.

The researcher assured subjects confidentiality and explained that the results of the study would not influence assessment of their student teaching experience in any way. The consent form questionnaire and videotape had an identification number to assure that the researcher could match data from the questionnaire and the videotape for the same subject. Student teachers were also told that they would remain anonymous in any written reports.

After volunteer student teachers had signed the consent form they completed the Teacher Efficacy Scale (Gibson & Dembo, 1984).

The second phase of data collection involved the videotaping of the lessons taught by the student teachers in the sample groups during the high school field experience (March 23 through to April 24, 1987). The

researcher contacted cooperating teachers in the schools and made arrangements for dates that student teachers would teach their experimental lesson (see Appendix E for the experimental lesson objective). Cooperating teachers were asked to distribute and collect consent forms for all pupils who would be involved in the lesson (see Appendix B). Pupils were assured anonymity and informed that the videotaped lesson would not be used for purposes other than this study.

On the arranged date the researcher arrived at the school in advance of the lesson time to set up the videotape color camera and recording equipment. The camera with a wide angle lens was set in such a way as to allow the recording of all pupils in the gymnasium throughout the entire lesson. The student teacher was requested to wear a wireless microphone so that all teacher comments were recorded on the videotape. The equipment was placed so as to avoid interfering with the lesson activity. All lessons were videotaped between March 25 and April 24, 1987.

Eight student teachers participated in a stimulated recall interview with the researcher as soon after the lesson as possible (e.g., during a preparation period, lunch break or after school). These interviews were audiotaped. During the interview itself the student teacher was allowed to stop the tape and reflect on

thoughts relating to pupils. In particular, the researcher probed for thoughts relating to: teacher behaviors which contributed to student success or learning opportunities, concerns student teachers had in relation to other influences that might have influenced the lesson outcome. No evaluative feedback was provided by the researcher. The audiotapes were transcribed into typed form so that data could be analyzed.

Three research assistants were trained to code videotaped lessons using the ALT-PE instrument (Siedentop, Tousignant, & Parker, 1982). Two assistants were sessional instructors at the University of Alberta who had knowledge of teaching the experimental lesson objective. One assistant was a university supervisor for secondary school student teacher practicums who had extensive teaching experience as well as knowledge relating to the experimental lesson objective. The sequence of tasks described in the coding manual were used to train observers so that they reached a minimum of 80% agreement in their interpretation of the observation samples (Siedentop, Tousignant, & Parker, 1982). The sequence of training tasks are briefly described below:

Task 1: Learning the definitions and symbol system.

Task 2: Assigning behavioral descriptions to the appropriate category.

Task 3: Utilizing the coding sheet properly.

Task 4: Beginning videotape analysis.

Task 5: Intermediate videotape analysis.

Task 6: Advanced videotape analysis.

The training procedures called for demonstrated mastery of the task before progressing on to the next task. The researcher maintained a decision log which recorded instances where decisions were difficult and these formed the coding conventions used by the trained observers. Once trained observers maintained 80% agreement on Task 6 they began to code lessons.

The training tasks required approximately twelve hours to complete. Some of the tasks involved the group of observers practicing and discussing tasks together. Other tasks were completed after each observer worked independently and then took a test with the researcher. All videotapes used for practice and testing were of student teachers teaching the same experimental lesson objective to groups of high school students during a pilot study. Thus, training tapes presented similar conditions to those found for the study. Testing segments were not used for training practice. The researcher was available to provide assistance to observers during all phases of the training.

Observers selected at random three pupils from each lesson to use for coding pupil behaviors. Often, pupils were selected because their apparel made them clearly

visible at all times (e.g., yellow sweat pants, white shorts, striped shirt). The pupil behavior was coded for the duration of the lesson. The Scored-Interval method of calculating reliability of data was used as a rigorous check on reliability by category (Hawkins & Dotson, 1975). Percentages higher than 75% are considered excellent (Siedentop, Tousignant, & Parker, 1982). Reliability checks occurred for 25% to 36% of the videotaped lessons (approximately every third or fourth lesson).

Pilot Study

A pilot study was conducted to refine data collection procedures. The purpose of the pilot study was to determine if the Teacher Efficacy Scale (Gibson & Dembo, 1984) needed revision, to revise the Background Information Questionnaire, to solicit feedback on the experimental lesson objective, to produce two videotapes of student teachers teaching the experimental lesson objective for training coders, and to establish a format for conducting stimulated recall interviews.

All pilot work was conducted with a group of student teachers who were distinct from the population for the study group but who were enrolled in an identical program in the previous year. The pilot group of student teachers had their field experiences and curriculum and

instruction course in secondary physical education in the fall term while the study population had these experiences in the winter term of the year.

The researcher met with the pilot group and explained the study in a similar fashion as was reported in the selection of the sample and phase one of the Data Collection Procedures. The pilot group of student teachers were asked to volunteer to complete the Teacher Efficacy Scale (Gibson & Dembo, 1984) but only two subjects were selected to teach the experimental lesson, be videotaped and interviewed.

The researcher solicited feedback on the experimental lesson objective from the pilot study group. Alterations in the explanation of the objective and refinement in wording of the stated objective resulted. Concerns of the student teachers in the pilot group were written down and collected by the researcher.

Two student teachers volunteered to plan a lesson based on the experimental lesson objective and teach the lesson during their high school field experience. The researcher contacted the cooperating teachers and made arrangements for the videotaping of the lessons. As a result, the researcher was provided the opportunity to develop training tape segments directly relating to the study. One of the two student teachers was asked to volunteer to be interviewed. The researcher was provided

the opportunity to establish a format for conducting the stimulated recall interviews as a result.

Data Analysis

The research problem was to determine relationships between student teachers' sense of teaching efficacy with pupil opportunity to achieve a specified motor skill objective in physical education. Presage, context and process variables were examined in relation to theoretical hypotheses. Descriptive data on student teachers' GTE and PTE beliefs and on process behaviors occurring during lessons were also included in this study. Measures on the variables were obtained from data on questionnaires, results of coding behaviors observed from videotaped lessons, and from interview transcripts.

Student teachers' teaching efficacy beliefs were raw scores on selected GTE and PTE belief items from the Teacher Efficacy Scale (Gibson & Dembo, 1984). Student teachers' presage characteristics resulting from a background information questionnaire were recorded as categorical measures (e.g., gender: 0=female, 1=male; program: 0=B. Ed., 1=After Degree). The process behaviors which occurred during the lessons were recorded as percentages of the total lesson time that the behavior was observed. Data from interviews were recorded as summary statements and frequencies were used to determine

the number of times selected statements were made by student teachers.

The class was used as the unit of analysis. The process behaviors coded from videotaped lessons were entered into an IBM program specifically designed to determine percentages of behaviors for specified categories. The researcher entered and verified data using the CALCUDAT micro computer program written by Brent Taylor. The program has been used in previous research using the ALT-PE coding system and is reliable. Once percentages were obtained resulting from coding sheets the data from the questionnaires and videotaped lessons were entered into the Michigan Terminal System (MTS) at the University of Alberta for further analysis. The Statistical Package for Social Sciences ($SPSS^X$) was used to analyze data. Measures of central tendency, variability and correlation were computed for variables. Subgroup comparisons based upon student teacher presage variables were analyzed with teaching efficacy variables and process behaviors. Teaching efficacy subgroup comparisons were also analyzed with process behaviors. A high teaching efficacy group consisted of eight student teachers who scored high on PTE but low on GTE beliefs, indicating that they perceived themselves as being able to attain instructional goals and overcome situational constraints. A low teaching efficacy group consisted of

seven student teachers who scored low on PTE but high on GTE beliefs, indicating they did not feel capable of attaining instructional goals and were not confident that good teaching could overcome situational constraints. Multiple linear regression analysis was conducted to reveal the relative importance of hypothesized variables to variations in obtained measures of pupil opportunity to learn motor skills in the experimental lesson. The multiple linear regression analysis was also conducted to examine whether various independent variables were potential predictors of variation in the dependent variable.

This study attempted to examine specified variables for their influence on ALT-PE(M) rates. Theory suggests that teachers' sense of efficacy may be a significant predictor of student achievement. Multiple linear regression analysis revealed the magnitude of the relationship between student teachers' sense of efficacy and pupil ALT-PE(M) rates in physical education.

CHAPTER FOUR

PRESENTATION OF RESULTS

Introduction

This chapter presents and discusses data from a study which examined student teachers' sense of personal and general teaching efficacy beliefs and the relationship of those beliefs to pupil academic learning time in gymnastic lessons. The first section of this chapter concerns the reliability of the instruments used to measure teachers' sense of efficacy and pupil academic learning time. Descriptive data concerning student teachers' sense of personal and general teaching efficacy and the pupil academic learning time process behaviors which occurred during gymnastic lessons taught by student teachers is presented in the second section of this chapter. In the third section the results of correlation and multiple regression analysis among variables are presented. A fourth section discusses the results of stimulated recall interviews.

Reliability of Instruments

Teacher efficacy scale. The Teacher Efficacy Scale (Gibson & Dembo, 1984) has been reported to measure the constructs of general and personal teaching efficacy with generally high internal consistency reliability. The Cronbach's alpha coefficients were reported at .78 for

PTE and .75 for GTE (Gibson & Dembo, 1984). However, Gibson and Dembo (1984) found that only 16 of the 30 items yielded significant reliability coefficients and suggested that responses to those particular items become the focus for future research. In this study it was found that two distinct groups of student teachers enrolled in the same program responded in a similar way to the items of the Teacher Efficacy Scale (Gibson & Dembo, 1984). Table 1 provides the mean scores for GTE and PTE beliefs for a pilot group and the sample group of secondary physical education student teachers.

Table 1

Teaching Efficacy Scores for Secondary Physical Education Student Teachers

		GTE[a]			PTE[b]		
Group	N	Mean	SD	Range	Mean	SD	Range
Pilot Study	24	18.6	4.7	13-29	39.6	3.8	33-48
Sample	30	22.3	5.6	12-32	39.4	4.7	32-48

[a]Based on 7 Items, possible total raw score=42.

[b]Based on 9 Items, possible total raw score=54.

Academic learning time in physical education. Three trained observers coded videotaped lessons. The observers were required to establish reliability with the use of the ALT-PE instrument (Siedentop, Tousignant, & Parker, 1982) before coding the videotapes. Frequent checks were made during the coding period to ensure that observers did not drift from the original definitions.

The Scored-Interval (S-I) method of calculating reliability provided a stringent assessment of reliability by category. This method is the most appropriate for use with the ALT-PE instrument (Siedentop, Tousignant, & Parker, 1982). Acceptable S-I agreement should be 80% or better when there are 11 or more scored target behavior intervals (Metzler, 1983b, pp. 188, 190). When scored target behavior categories number between 6 and 10 the S-I agreement should be 70% or better. When scored target behavior categories number less than 6 the S-I agreement should be 60% or better. The S-I method uses intervals in which only target behaviors are coded and omits intervals in which neither observer codes the target behavior. An agreement includes intervals in which both observers code the target behavior. A disagreement occurs when only one observer codes the target behavior (Metzler, 1983b, p. 187).

$$S\text{-}I = \frac{\text{Agree(Yes)}}{100 \times \text{Agree(yes)} + \text{Disagree}}$$

Table 2 presents the interobserver agreements determined through independent coding procedures after training and during the coding of videotaped lessons. The major dependent variable in this study was the amount of accrued ALT-PE(M) by pupils during one lesson. The two categories of behavior which were used to calculate ALT-PE(M) intervals include an initial decision about whether the class context has a focus on motor involvement with physical education activities (SM Motor). The second decision indicates whether the individual learner being observed is involved with the subject matter oriented motor activities (Motor Engaged). Observers in this study maintained excellent reliability levels, ranging from 80% to 100% agreement for variables included in the data analysis. The reliability checks were done on 25% to 36% of the coded lessons. Observers were checked for reliability after approximately every third or fourth lesson. Thus, the number of reliability checks varied for observers according to how many lessons they coded.

Descriptive Data

Teaching efficacy. A total of sixteen items from

Table 2

Percentage S-I Agreements for ALT-PE Categories

	Observer		
Category	1	2	3
Motor Engaged			
Training	90.0	87.1	92.1
Check 1	100.0	95.7	84.6
Check 2	93.3	91.7	80.0
Check 3	93.8	82.4	
Check 4		85.7	
SM Motor			
Training	100.0	95.6	100.0
Check 1	100.0	98.5	100.0
Check 2	88.8	98.3	96.3
Check 3	97.4	96.9	
Check 4		100.0	

the Teacher Efficacy Scale (Gibson & Dembo, 1984) were used to determine a student teacher's sense of general and personal teaching efficacy. See Appendix D for the Teacher Efficacy Scale. Items 2, 4, 6, 16, 23, 27 and 30 were used to determine GTE. Items 1, 12, 14, 15, 19, 21,

24, 25 and 29 were used to determine PTE. The mean, median, standard deviation and range of GTE and PTE scores for student teachers are presented in Table 3. The student teachers' scores for GTE were slightly more variable than for PTE. Figure 7 presents a schematic plot of teaching efficacy scores and provides a picture of the shape of the distribution of scores. Through the use of these exploratory data analysis techniques (Erickson & Nosanchuk, 1977) it is possible to note that the scores for PTE trail off toward the upper end of the distribution whereas the shape of the distribution for GTE scores is approximately normal. No scores were found to be outliers or extremely above or below the upper or lower quartiles.

Table 3

Descriptive Data for GTE and PTE Scores of Secondary Physical Education Student Teachers (n=30)

	Mean	Median	SD	Range
GTE[a]	22.3	22.5	5.6	12-32
PTE[b]	39.4	38.0	4.7	32-48

[a]Based on 7 items with a possible total of 42.

[b]Based on 9 items with a possible total of 54.

The SPSS^{x} program was used to provide a breakdown of the teaching efficacy variables by subgroups. The GTE and PTE variables were examined according to the following subgroups: previous teaching experience related to the lesson objective (teach), gender of the student teacher, whether the student teacher had received a previous degree or not (program), and whether the student teacher had taken a course appropriate to the demands of the study (course). Table 4 provides the mean and standard deviations of GTE and PTE scores according to the subgroups. It appeared that the student teachers in the sample were responding in a similar way within various subgroups. There was little difference in the mean or standard deviation of GTE or PTE scores when examined according to teaching experience, gender or whether student teachers had completed a previous degree. The GTE scores appear to have more variation according to whether the student teacher had completed a course relevant to the task demands of this study; the course work needed to focus on gymnastics to be relevant to this study. However, few student teachers had not taken a relevant course and it is difficult to say that this subgroup was responding to GTE very differently. The subgroups examined in this study did not indicate

systematic differences in how student teachers responded to GTE and PTE items.

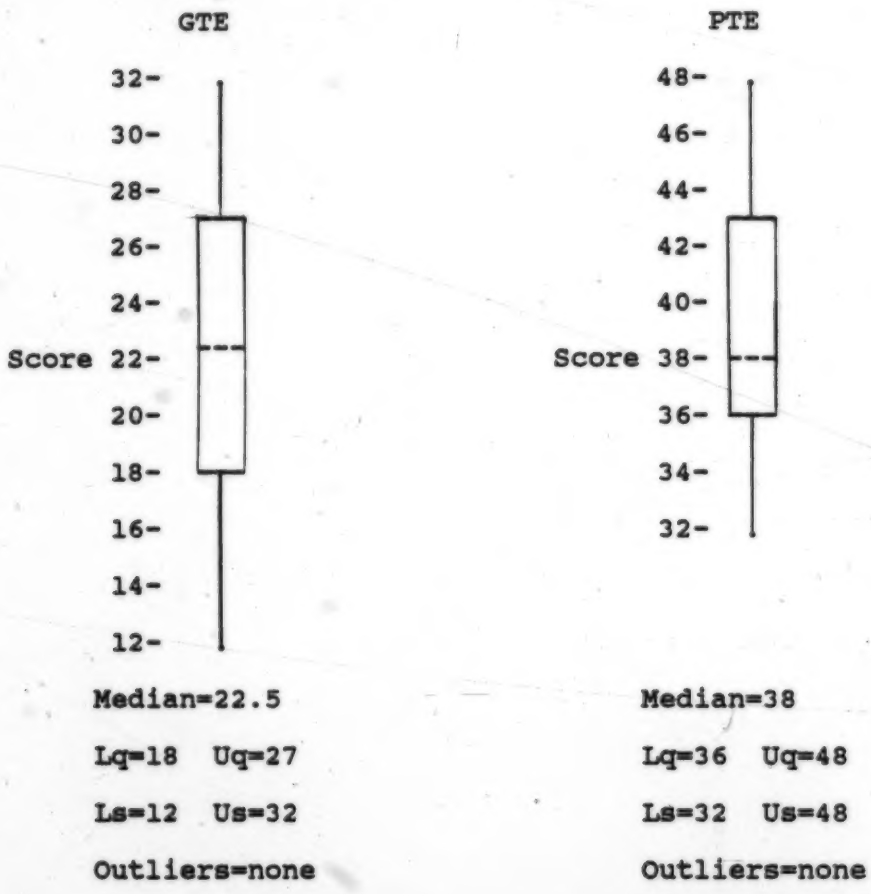

Figure 7. Schematic Plot of GTE and PTE Scores of Secondary Physical Education Student Teachers.

To test the hypothesis that student teachers' responses to the GTE and PTE items were partly a function of teaching experience, whether they had taken a course, had another relevant degree or were of a particular gender, a one-way analysis of variance was completed.

The exploratory data analysis revealed that the subgroups appeared to meet the assumptions regarding normal distribution and equal variance. The $P<.05$ level of probability was used to evaluate the relevant F-ratios.

Table 4

Means and Standard Deviations of GTE and PTE Scores by Subgroups

Subgroup		n	GTE Mean	GTE SD	PTE Mean	PTE SD
Gender	0=F	12	22.67	6.01	40.00	5.56
	1=M	18	22.11	5.51	39.06	4.15
Program	0=B.Ed.	19	22.58	5.22	38.74	4.34
	1=After Degree	11	21.91	6.49	40.64	5.24
Course	0=None	8	22.88	4.67	40.13	5.17
	1=Yes	22	22.14	6.01	39.18	4.62
Teach	0=No	18	22.17	5.51	39.67	4.83
	1=Yes	12	22.58	6.01	39.08	4.68

Table 5

One-way Analysis of Variance for GTE Scores by Subgroups

Subgroup	Source of Variance	df	SS	MS	F-ratio	P
Gender	Between	1	2.22	2.22	.07	.80
	Within	28	912.44	32.59		
Program	Between	1	3.13	3.13	.10	.76
	Within	28	911.54	32.56		
Course	Between	1	3.20	3.20	.10	.76
	Within	28	911.47	32.55		
Teach	Between	1	1.25	1.25	.04	.85
	Within	28	913.42	32.62		

Tables 5 and 6 report the results of the one-way analysis of variance for GTE and PTE scores by subgroups. The results of the one-way analysis of variance tests indicated that there were no significant differences between subgroups in the sample in relation to GTE and PTE scores. However, the results should be interpreted with caution because of the small number of subjects in each subgroup. It appears that GTE and PTE score variations were not a reflection of student teachers' previous teaching experience, course work, nor dependent upon the type of program or the gender. It appeared that

the presage variables did not relate to variations in student teachers' GTE and PTE scores.

Academic learning time in physical education. When coding pupil academic learning time in physical education observers first made a decision regarding class context and secondly made a decision about a particular target pupil's involvement. When the class context dealt with subject matter motor activities and the individual pupil

Table 6

One-way Analysis of Variance for PTE Scores by Subgroups

Subgroup	Source of Variance	df	SS	MS	F-ratio	P
Gender	Between	1	6.42	6.42	.28	.60
	Within	28	632.94	22.61		
Program	Between	1	25.14	25.14	1.15	.29
	Within	28	614.23	21.94		
Course	Between	1	5.22	5.22	.23	.63
	Within	28	634.15	22.65		
Teach	Between	1	2.45	2.45	.11	.75
	Within	28	636.92	22.75		

was successfully engaged in the activity, then the coded behavior resulted in a unit of ALT-PE(M). During the coding of videotaped lessons utilizing the ALT-PE instrument (Siedentop, Tousignant, & Parker, 1982) observers reported on thirteen class context variables and eight pupil involvement variables. Three target pupils were coded for each videotaped lesson from the beginning to the end of the instructional time. Each instructional episode was coded for as many intervals as was necessary in order to include behaviors throughout the entire lesson. Thus, the number of intervals coded for each lesson varied. The percentages indicate the number of times out of the total number of intervals for the lesson that a behavior was observed. Tables 7 and 8 present the mean, standard deviations and ranges for percentages of behaviors occurring in lessons according to ALT-PE categories (Siedentop, Tousignant, & Parker, 1982).

The results indicated that pupil ALT-PE(M) percentages for the gymnastic lessons taught by student teachers ranged from 3.9% to 21.3% with a mean percentage of 10.6%. The total motor engagement percentage of pupils (including successful and unsuccessful attempts for activities as well as participation of an assisting nature) was found to range from 4.3% to 25.3% with a mean percentage of 13.0%. Pupil involvement in non-subject

matter tasks (e.g., an interruption of an activity, waiting a turn, off task behavior, a transition or management task, warm up activity or cognitive response) far exceeded the pupil motor engagement rates (87% to 13%

Table 7

Mean, Standard Deviations, and Ranges for Percentages of ALT-PE Categories for Context Level Decisions (n=30)

Category	Mean	SD	Range
Context Level	100.1		
General Content	26.8		
Transition	14.5	5.7	3.9 - 25.3
Management	1.6	2.6	0.0 - 11.2
Warm Up	10.7	6.2	0.0 - 23.1
SM Knowledge	19.1		
Technique	14.5	9.0	0.0 - 36.2
Strategy	4.1	3.2	0.0 - 17.4
Rules	0.5	1.2	0.0 - 5.9
SM Motor	54.2		
Skill Practice	14.2	12.2	0.0 - 51.0
Scrimmage/Routine	28.1	18.7	0.5 - 74.4
Game/Performance	11.9	9.0	0.6 - 48.6

Table 8

Mean, Standard Deviations, and Ranges for Percentages of ALT-PE Categories for Learner Involvement Decisions (n=30)

Category	Mean	SD	Range
Learner Involvement Level	100.0		
Not Motor Engaged	87.0		
Interim	4.9	2.1	1.9 - 8.7
Waiting	12.6	6.4	0.5 - 26.6
Off Task	15.5	8.3	4.2 - 40.2
On Task	16.3	7.9	1.4 - 32.3
Cognitive	37.7	9.0	20.5 - 53.8
Motor Engaged	13.0		
Motor Appropriate[a]	10.6	5.1	3.9 - 21.3
Motor Inappropriate	1.4	1.3	0.0 - 5.6
Motor Support	1.0	2.7	0.0 - 14.7

[a]Motor Appropriate = ALT-PE(M)

respectively). When pupils were not engaged in motor activities, they were primarily involved in listening to the teacher's instruction, watching a demonstration or participating in a discussion (37.7% of the lesson time). The class context focusing on motor involvement in

physical education activity was approximately 54% of the total lesson time. Almost half of the class context time was devoted to general context unrelated to the physical education objective and to a focus on knowledge related to the physical education objective (26.8% and 19.1% respectively). The results indicated that the student teachers were able to focus half of the lesson time on involvement in motor activities but pupils were involved in motor appropriate tasks with high success rates only ten percent of the lesson time.

Table 9 presents a further analysis of ALT-PE(M) and reveals that most of the successful motor engagement activities occurred during pupil practice of the gymnastic routine (5.4% of lesson time). Pupils also had success during practice of specific skills related to the lesson objective (3.9% of lesson time). The only other time pupils exhibited successful motor engagement behavior was during a final performance of the sequence or by participating in a technique demonstration (0.9% and 0.2% respectively).

Table 10 presents the means and standard deviations of ALT-PE(M) and motor engagement percentages by various subgroups of the sample. Examination of the standard deviations showed that most subgroups had similar variation in the spread of ALT-PE(M) and motor engagement percentages. The student teachers who held a physical

Table 9

Percentage of ALT-PE(M) During Class Context Categories of Lessons Taught by Secondary Physical Education Student Teachers

Class Context Category	ALT-PE(M)
Skill Practice	3.9
Scrimmage/Routine	5.4
Game/Performance	0.9
Technique Demonstration	0.2
Total	10.4

Note. ALT-PE(M) = successful motor engagement on tasks.

education degree had much more variation in motor engagement and ALT-PE(M) percentage rates than did those student teachers not holding a previous degree. Female student teachers had more variation in ALT-PE(M) percentages than did male student teachers. It did not appear that differences in ALT-PE(M) or motor engagement percentages were related to previous teaching experience or whether student teachers had taken a course relating to the lesson objective. However, ALT-PE(M) percentages were higher for female student teachers than for males. Student teachers holding a physical education degree also

showed greater variation as compared to those student teachers without a degree.

Table 10

ALT-PE(M) and Motor Engagement Percentages by Subgroups

			ALT-PE(M)		Motor Engaged	
Subgroup		n	Mean	SD	Mean	SD
Gender	0=F	12	12.28	6.02	14.20	6.52
	1=M	18	9.41	4.19	12.14	5.12
Program	0=B.Ed.	19	10.78	4.37	13.43	4.76
	1=After Degree	11	10.16	6.42	12.16	7.25
Course	0=None	8	8.21	3.51	9.69	4.08
	1=Yes	22	11.41	5.39	14.15	5.82
Teach	0=No	18	11.06	5.28	12.99	5.94
	1=Yes	12	9.81	4.97	12.92	5.60

To test the hypothesis that pupil engagement time (ALT-PE(M) and motor engagement) was partly a function of teaching experience, course work, another relevant degree, or gender, a one-way analysis of variance was completed using the SPSS^{X} program. The $P<.05$ level of

probability was used to evaluate the relevant F-ratios. Tables 11 and 12 report the results of the one-way analysis of variance for ALT-PE(M) and motor engagement percentages by subgroups.

Table 11

One-way Analysis of Variance for ALT-PE(M) by Subgroups

Subgroup	Source of Variance	df	SS	MS	F-ratio	P
Gender	Between	1	59.05	59.05	2.37	.14
	Within	28	698.20	24.94		
Program	Between	1	2.68	2.68	0.10	.75
	Within	28	754.57	26.95		
Course	Between	1	59.95	59.95	2.41	.13
	Within	28	697.31	24.90		
Teach	Between	1	11.20	11.20	0.42	.52
	Within	28	746.05	26.64		

The results of the one-way analysis of variance tests indicated that there were no significant differences between sample subgroups in relation to ALT-PE(M) and motor engagement percentages ($P<.05$). In the examination of the motor engagement percentages (ALT-PE(M), unsuccessful attempts and assisting motor

activities) using the less stringent probability level (P<.10) significant differences occurred when student teachers who had taken a relevant course for the lesson objective were compared with those who had not taken a course (F=3.96, df=1/28, P<.10). Caution must be taken when interpreting these results as significant because of the likelihood of making a Type I error.

Table 12

One-way Analysis of Variance for Motor Engagement Time by Subgroups

Subgroup	Source of Variance	df	SS	MS	F-ratio	P
Gender	Between	1	30.59	30.59	0.94	.340
	Within	28	913.74	32.63		
Program	Between	1	11.11	11.11	0.33	.570
	Within	28	933.22	33.33		
Course	Between	1	117.07	117.07	3.96	.056*
	Within	28	827.26	29.55		
Teach	Between	1	.04	.04	0.00	.972
	Within	28	944.29	33.73		

P<.10

Teaching efficacy subgroups and academic learning time in physical education. Eight student teachers who scored above the median in PTE scores and below the median in GTE scores were in a high teaching efficacy group. Their scores indicated that they perceived themselves as being confident in their ability to overcome situational constraints and able to attain instructional goals.

Seven student teachers who scored below the median in PTE scores and above the median in GTE scores were in a low teaching efficacy group. Their scores indicated that they felt less capable of attaining instructional goals and were not confident in their ability to overcome situational constraints.

The research literature suggests that there will be significant differences in teaching behavior based upon whether the person has high or low teaching efficacy beliefs. In general, the high teaching efficacy teachers exhibit behaviors that result in pupil attainment of instructional goals indicating a greater amount of pupil achievement (Ashton & Webb, 1986). Table 13 provides the means and standard deviations of behaviors observed through the use of the ALT-PE instrument (Siedentop, Tousignant, & Parker, 1982) for student teachers in high and low teaching efficacy subgroups.

Table 13

Means and Standard Deviations of ALT-PE Percentages for High and Low Teaching Efficacy Subgroups

	Low Group (n=7)		High Group (n=8)	
Category	Mean	SD	Mean	SD
Transition	17.3	6.0	13.7	6.4
Management	3.3	3.9	0.5	0.8
Warm Up	9.5	5.0	12.8	6.1
Technique	17.8	9.8	16.1	10.7
Strategy	3.8	1.9	3.8	2.0
Skill Practice	19.5	10.5	10.5	11.5
Scrimmage/Routine	16.1	12.6	31.4	21.7
Game/Performance	12.1	16.2	10.9	7.7
Interim	4.3	1.8	3.9	1.9
Waiting	12.5	7.7	12.8	6.8
Off Task	15.2	9.7	16.1	11.8
On Task	16.9	7.8	18.2	9.1
Cognitive	38.4	10.2	37.9	11.9
Motor Appropriate[a]	7.9	3.2	10.4	4.4
Motor Engaged[b]	12.5	5.3	11.1	4.7

[a]Motor Appropriate = ALT-PE(M)

[b]Motor Engaged = Ma+Mi+Ms

The results indicated that student teachers in the high teaching efficacy group obtained higher percentages of ALT-PE(M) than did the low teaching efficacy group. The high teaching efficacy group also had a lower percentage of pupil motor responses that were of an assisting or inappropriate nature than did the low teaching efficacy group (0.7% and 4.6% respectively). An inspection of the data revealed that pupils in the high teaching efficacy groups were involved in successful motor responses more often than pupils in the low teaching efficacy groups. A further analysis of Table 13 revealed that pupils of teachers in the high teaching efficacy group spent less time in transition and management activities than did pupils of teachers in the low teaching efficacy group. Time spent on technique instruction was also lower for the high teaching efficacy group than for the low teaching efficacy group. These results suggested that the class context time was more favorable to the learning of motor skills for student teachers in the high teaching efficacy group. This is further indicated in the analysis of the subject matter motor category of behavior. The pupils of the student teachers in the high teaching efficacy group spent about twice as much time actively working on the gymnastics routine which was the main goal of the lesson than did pupils of the low teaching efficacy group. It was

interesting to note that pupils of the low efficacy teaching group spent more time practicing isolated skills related to the lesson objective but did not achieve higher percentages of successful motor engagement times (ALT-PE(M)) relating to the achievement of the lesson goal. This indicated that the time spent on the practice of the gymnastics routine led to higher percentages of successful motor responses related to the lesson objective. Thus, the type of practice should be closely related to the lesson objective for the amount of ALT-PE(M) time to be maximized.

An independent samples t-test was conducted to determine whether the mean percentage rates for the ALT-PE behavior categories for the student teachers in the high teaching efficacy group was significantly different from that of the low teaching efficacy group. The results of the t-test as reported in Tables 14 and 15 indicated that there was no significant difference in the mean ALT-PE(M) percentage for pupils of student teachers in either the high or the low teaching efficacy group ($t=-1.24$, $df=13$).

It is interesting to note that at the less stringent probability level of $P<.10$, there were significant differences between student teachers in the high and low teaching efficacy group and the time pupils spent on

Table 14

t-Test for High and Low Teaching Efficacy Groups with the Context Level Categories

Category	Group[a]	Mean	SD	t	df	P
Transition	Low	17.27	6.0	1.10	13	.29
	High	13.74	6.4			
Management	Low	3.34	3.9	2.05	13	.06
	High	0.46	0.8			
Warm Up	Low	9.47	5.0	-1.16	13	.27
	High	12.84	6.1			
Technique	Low	17.76	9.8	0.30	13	.77
	High	16.14	10.7			
Strategy	Low	3.83	1.9	0.07	13	.95
	High	3.76	2.0			
Skill Practice	Low	19.51	10.5	1.58	13	.14
	High	10.49	11.5			
Scrimmage/Routine	Low	16.10	12.6	-1.63	13	.13
	High	31.39	21.7			
Game/Performance	Low	12.13	16.2	0.19	13	.85
	High	10.89	7.7			

[a]Low Group = 7 subjects; High Group = 8 subjects

Table 15

t-Test for High and Low Teaching Efficacy Groups with the Learner Involvement Categories

Category	Group[a]	Mean	SD	t	df	P
Interim	Low	4.30	1.8	0.38	13	.71
	High	3.94	1.9			
Wait	Low	12.51	7.7	-0.08	13	.94
	High	12.80	6.8			
Off Task	Low	15.24	9.7	-0.15	13	.88
	High	16.11	11.8			
On Task	Low	16.87	7.8	-0.30	13	.77
	High	18.18	9.1			
Cognitive	Low	38.43	10.2	0.10	13	.92
	High	37.85	11.9			
Motor Appropriate[b]	Low	7.90	3.2	-1.24	13	.24
	High	10.41	4.4			
Motor Engaged[c]	Low	12.53	5.3	0.54	13	.60
	High	11.13	4.7			

[a]Low Group = 7 subjects
High Group = 8 subjects

[b]Motor Appropriate = ALT-PE(M)

[c]Motor Engaged = Ma+Mi+Ms

management types of activities, unrelated to lesson goals ($t=2.05$, $P<.10$). Approaching significance were differences between the two groups and the time pupils spent practicing individual skills ($t=1.58$, $P=.14$) and the time spent practicing the routine relating to the lesson objective ($t=-1.63$, $P=.13$).

These results suggested that student teachers in high and low teaching efficacy groups do have some important behavioral differences in their lessons. The pupil time spent on management activities and on type of practice directly relating to the lesson goals appear to be related to teaching efficacy beliefs.

Correlation Data

The SPSS^X program was used to determine correlations for data collected on variables included in the study. The Pearson product-moment correlation was used to examine the strength of association among variables. The initial examination involved an overview of the data. For more in-depth analysis, the data were examined to determine relationships between student teacher presage (background) variables and context variables (class size) and their teaching efficacy beliefs. The data were also examined to determine relationships between student teacher presage and context variables and pupil motor engagement and ALT-PE(M) rates. Another analysis was

conducted to determine relationships between ALT-PE variables and teaching efficacy beliefs.

Presage and context variables with teaching efficacy variables. Table 16 presents the Pearson product-moment correlation coefficient, the coefficient of determination and the significance level of the observed relationship for student teacher presage variables and their general and personal teaching efficacy beliefs. The gender, program, course, and teaching variables were measured as dichotomous variables (e.g., the student teacher either had or had not completed a related course). The age and class size variables were measured as continuous variables. The SPSS^X computer program for Pearson product-moment correlation uses equivalent computations for variables that are measured as dichotomous or continuous (Cohen & Cohen, 1975).

The results of the correlation analysis indicated that there was no systematic relationship between the student teachers' teaching efficacy beliefs and their age, gender, program, teaching experience or whether they had completed a relevant course related to the research task. This suggests that previous experiences or personal attributes measured in this study have very little influence on student teachers' teaching efficacy beliefs. The age variable was significantly related to

Table 16

Pearson Product-Moment Correlation for Student Teacher Presage Variables with GTE and PTE

	GTE			PTE		
Variable	r	r^2	SIG	r	r^2	SIG
Gender	-.05	.00	.40	-.10	.01	.30
Program	-.06	.00	.38	.20	.04	.15
Course-Relevant	-.06	.00	.38	-.09	.01	.32
Teach Experience	.04	.00	.42	-.06	.00	.37
Age	-.25	.06	.09	[illegible]8	.03	.17

GTE beliefs at the less stringent probability level of P<.10.

A further examination of the relationship of student teachers' teaching efficacy beliefs with presage and context variables was conducted. The strength of the association between presage and context variables with student teachers in the high and low teaching efficacy groups was determined with the Pearson product-moment correlation procedure. Table 17 reports the Pearson product-moment correlation coefficient, the coefficient of determination and the significance level of the

observed relationship for student teacher presage and context variables with teaching efficacy groups. The results indicated that there was no systematic relationship between presage and context variables measured in this study and the high or low teaching efficacy groups.

Presage and context variables with motor engagement rates. Table 18 presents the Pearson product-moment correlation coefficient, the coefficient of determination and the significance level of the observed relationship for student teacher presage and context variables with the motor engagement and ALT-PE(M) variables.

The results of the Pearson product-moment correlation analysis indicated that the motor engagement rate of pupils was positively related to the course and age variables. This suggests that there was a significant and positive association between student teachers who have had a subject matter course related to the research lesson objective and higher motor engagement rates of pupils ($r=.35$, $P<.05$). However, the association between student teachers having completed a relevant course and pupil ALT-PE(M) was not as strong as the association of the course variable and pupil motor

Table 17

Pearson Product-Moment Correlation for Teaching Efficacy Groups with Presage and Context Variables

Variable	r	r^2	SIG
Gender	-.15	.02	.21
Program	.06	.00	.37
Course-Relevant	.03	.00	.44
Teach Experience	-.23	.05	.11
Age	.23	.05	.11
Size of Class	-.13	.02	.24

engagement time (r=.28, P<.10). The results also indicated a low negative Pearson product-moment correlation between a student teacher's gender and pupil ALT-PE(M) (r=-.28, P<.10). This suggests that if the student teacher was male, the ALT-PE(M) rates tended to be lower. However, this may be a reflection of the gender of the pupils in the class rather than of the student teacher as male student teachers taught male pupils and female student teachers taught female pupils. A moderate negative relationship was found between the student teacher's age and the motor engagement and ALT-

PE(M) variables (r=-.30, P=.06 and r=-.25, P<.10 respectively). This suggests that the older the student

Table 18

Pearson Product-Moment Correlation for Student Teacher Presage and Context Variables with Motor Engagement and ALT-PE(M) Rates

	Motor Engagement[a]			ALT-PE(M)[b]		
Variable	r	r^2	SIG	r	r^2	SIG
Gender	-.18	.03	.17	-.28	.08	.07
Program	-.11	.01	.28	-.06	.00	.38
Course-Relevant	.35	.12	.03	.28	.08	.07
Teach Experience	-.01	.00	.49	-.12	.01	.26
Age	-.30	.09	.06	-.25	.06	.10
Class Size	-.17	.03	.18	-.13	.02	.24

[a]Motor Engagement = Ma+Mi+Ms

[b]ALT-PE(M) = Ma

teacher, the lower the pupil motor engagement rate. However, the student teachers in this study were similar in age and few ranged far from the mean age of the sample. Thus, this finding is difficult to interpret.

The correlation analysis indicated that there was no systematic relationship between the presage and context variables and the motor engagement or ALT-PE(M) variables. The course work variable appeared to be associated with higher pupil motor engagement time and to a lesser extent related to ALT-PE(M) rates. The age of the student teacher may have some negative relationship to pupil motor engagement rates. It appeared that the presage and context variables measured in this study had minimal relationship to either of the motor engagement variables used in this study.

Teaching efficacy variables with motor engagement rates. A correlation analysis was performed to examine the strength of the relationship between the dependent and independent variables used in this study. Table 19 reports the Pearson product-moment correlation coefficient, the coefficient of determination and the observed significance level for student teacher teaching efficacy variables and pupil motor engagement rates.

The results indicated that there was no systematic association between student teachers' teaching efficacy beliefs and the pupil motor engagement or ALT-PE(M) rates. Approaching significance was the negative relationship of student teachers' beliefs in their personal teaching efficacy and pupil motor engagement rates ($r=-.24$, $P=.10$). Student teachers who perceived

Table 19

Pearson Product-Moment Correlation for Student Teacher Teaching Efficacy Beliefs with Motor Engagement and ALT-PE(M)

	GTE			PTE		
Variable	r	r^2	SIG	r	r^2	SIG
Motor Engagement[a]	-.14	.02	.22	-.24	.06	.10
ALT-PE(M)[b]	-.22	.05	.12	.01	.00	.48

[a]Motor Engagement=Ma+Mi+Ms

[b]ALT-PE(M)=MA

their personal teaching efficacy as high tended to achieve lower pupil motor engagement rates. A positive relationship between these two variables has been found by previous research. Also approaching significance was the finding that indicated a low negative relationship between a student teachers' GTE beliefs and pupil ALT-PE(M) (r=-.22, P=.12). The negative direction of this relationship has been predicted by previous research. It appeared in this study that student teachers' beliefs in their own ability to teach a specific lesson objective

did not correlate with higher pupil motor engagement or ALT-PE(M) rates.

Teaching efficacy variables with class context and learner involvement variables. A further examination of the data was conducted to determine the strength of the relationship between student teachers' teaching efficacy beliefs and class context and learner involvement variables. Tables 20 and 21 report the Pearson product-moment correlation coefficient for the class context and learner involvement variables measured with the ALT-PE instrument (Siedentop, Tousignant, & Parker, 1982) with the measures of general and personal teaching efficacy.

The results indicated that the student teachers' GTE beliefs appear to be associated with the amount of time pupils spend on management and waiting activities and on successful ALT-PE(M). Student teachers who perceived that good teachers could not overcome constraints in teaching and influence learning tended to have high amounts of pupil management and waiting rates ($r=.29$, $P<.10$ and $r=.29$, $P<.10$ respectively). Student teachers who believed more strongly in the ability of good teachers to overcome constraints tended to have higher amounts of pupil ALT-PE(M).

The results also indicated that student teachers who believed less strongly in their own capabilities to achieve learning objectives tended to have higher rates

Table 20

Pearson Product-Moment Correlation for Teaching Efficacy Beliefs with Context Level Categories

Category	GTE	PTE
Context Level		
General Content		
Transition	.18	.13
Management	.29*	-.20
Warm Up	.00	.19
SM Knowledge		
Technique	-.14	.03
Strategy	-.05	-.09
SM Motor		
Skill Practice	.15	-.16
Scrimmage/Routine	-.14	.08
Game/Performance	.05	-.09

*P≤.10

of pupil interim (interruption of ongoing activity) behavior and motor engaged activities. Previous research has found a significant relationship between PTE beliefs and higher pupil engagement rates. The results of this study do not support the significant findings of previous

Table 21

Pearson Product-Moment Correlation for Teaching Efficacy Beliefs with Learner Involvement Categories

Category	GTE	PTE
Not Motor Engaged		
Interim	-.08*	-.22*
Wait	.29*	.16
Off Task	-.02	-.13
On Task	-.01	.13
Cognitive	-.07	.10
Motor Engaged		
Motor Appropriate[a]	-.22*	.01
Motor Engaged[b]	-.14	-.24*

[a]Motor Appropriate = ALT-PE(M)

[b]Motor Engaged = Ma+Mi+Ms

*$P \leq .10$

research. The strength of the relationship between student teachers in high and low teaching efficacy groups with the class context and learner involvement variables was also examined. Table 22 presents the results of the Pearson product-moment correlation for student teachers

in high and low teaching efficacy groups and the class context and learner involvement variables.

Table 22

Pearson Product-Moment Correlation for Student Teachers in High or Low Teaching Efficacy Groups with Class Context and Learner Involvement Categories

Class Context	Ef Group	Learner Involvement	Ef Group
General Content			
Transition	-.21**	Not Motor Engaged	
Management	-.40*	Interim	-.08
Warm Up	.20**	Waiting	.02
SM Knowledge		Off Task	.04
Technique	-.05	On Task	.07
Strategy	-.01	Cognitive	-.02
SM Motor		Motor Engaged	
Skill Practice	-.26**	Motor Appropriate[a]	.16
Scrimmage/Routine	.28**	Motor Engaged[b]	-.10
Game/Performance	-.05		

[a]Motor Appropriate = ALT-PE(M)

[b]Motor Engaged = Ma+Mi+Ms

*$P<.05$

**$P\leq.10$

The results suggested that there were significant differences between student teachers in the high and low teaching efficacy groups and the amount of time spent on management activities ($r=-.40$, $P\leq.05$). Differences in the amount of class time spent on transition, warm up, skill practice and practice of the routine approached significance. These results suggested that pupils of student teachers in the low teaching efficacy group spent significantly more time on management activities. These activities provide fewer opportunities for learners to be engaged in motor responses which can lead to the accomplishment of the lesson objective. Pupils of student teachers in the high teaching efficacy group spent more time on warm up and practice of the routine. The time spent on practicing the routine provides learners with opportunities to be engaged in appropriate motor responses for achieving the lesson objective. However, the low correlations for learner involvement variables and student teacher efficacy groups did not indicate any significant differences for student teachers in high or low teaching efficacy groups and pupil ALT-PE(M) or motor engagement rates. This suggests that even though the student teachers in the high teaching efficacy group were able to structure the class context that would provide opportunities for learners to be engaged in appropriate motor responses for the lesson objective to

be achieved, they were unable to achieve significantly more pupil motor engagement time in their lessons.

Multiple Regression Data

Multiple linear regression analysis was used to further examine relationships among variables. Stepwise selection of independent variables was the procedure used to determine multiple linear regression models. In stepwise selection procedures the first variable considered for entry into the equation is the one with the largest correlation with the dependent variable. The criteria for entry was set at the probability level of $P<.10$ of the F value. Multicolinear variables were detected through computation of the tolerance of the variable. The tolerance refers to the proportion of variability in an independent variable not explained by the other independent variables. If the tolerance of the variable is less than .0001 the variable is not entered in the equation. If the first variable fails to meet entry requirements the procedure stops with no independent variables in the equation. If it passes entry criteria it is entered into the equation and then examined to see whether it should be removed according to the removal criterion. If it stays in the equation the

next step is to examine variables not in the equation for entry possibility. The process continues until no more variables meet entry and removal criteria.

The independent variables were determined on the basis of the theory that teaching efficacy belief variables would contribute significantly to the prediction of motor engagement and ALT-PE(M) rates. The two belief variables GTE and PTE were not highly correlated with each other (r=-.10, P=.31). The course and age variables were also included in the model because they showed the largest correlations with the dependent variables.

Initially, a stepwise selection procedure was attempted in order to determine a regression model using the criterion for inclusion with a probability of the F statistic less than or equal to P<.05. This prodecure did not enter any of the independent variables on the first step and no multiple linear regression equation resulted. Consequently, the default criteria for entry and deletion were adjusted to reflect the less stringent probability level of the F statistic at P<.10. The stepwise procedure was attempted with the same variables as before.

With motor engagement as the dependent variable, the only independent variable that was entered into the model at the first step was the course variable. The age, GTE

and PTE belief variables were not entered in the second step. Table 23 presents the results of the multiple linear regression analysis for the stepwise procedure. The model yielded a multiple R of .35 which was significantly different from R=0 with a calculated $F_{(1,28)}$ of 3.962. The R^2 for the model was .124. This model indicated that 12 percent of the variance in pupil motor engagement time was predictable on the basis of the course variable. This left 88 percent of the variation in motor engagement time unexplained by the predictor variable. The remaining independent variables were not entered into the model because the probability level associated with the F test exceeded the criterion level of P<.10.

When ALT-PE(M) was used as the dependent variable in the model, none of the specified independent variables entered the equation at the first step of the stepwise procedure.

When the dependent variable was identified as motor engagement time, which includes ALT-PE(M) plus unsuccessful motor responses and assisting motor responses, neither PTE nor GTE beliefs contributed significantly to the predictability. However, the course variable contributed to the predictability of motor engagement time. The results also showed that the teaching efficacy belief variables, along with course and

Table 23

Multiple Linear Regression Analysis for the Model Using Motor Engagement as the Dependent Variable

Multiple R=0.35209 R^2=0.12397

Source of Variance	df	Sum of Sq	Mean Sq	F
Regression	1	117.07	117.07	3.962*
Residual	28	827.26	29.55	

Variables in Eq	B	SE B	Beta	T
Course	4.467	2.244	.352	1.991*
(Constant)	9.688	1.922		5.041

Variables Not in Equation	Beta In	Part	Min Tol	T
GTE	-.123	-.132	.997	-.690
PTE	-.211	-.224	.992	-1.195
Age	-.181	-.175	.819	-.923

*P=.0564

age variables, were not found to be predictor variables for pupil ALT-PE(M) rates. These results are contradictory because theory suggests that teaching efficacy beliefs should have a significant influence on teaching behavior and consequently pupil learning. The findings of this study suggested that neither GTE or PTE beliefs contributed significantly to the predictability of pupil learning opportunities as measured by ALT-PE(M) or motor engagement time. It appeared that the completed course work variable may be a better predictor of pupil ALT-PE(M) or motor engagement times.

Stimulated Recall Interviews

Approximately one quarter of the sample of student teachers (26.7%) were involved in stimulated recall interviews following the teaching of the experimental lesson. Four male and four female student teachers were selected primarily based upon the time available to either the student teacher and/or the researcher for conducting the interview as soon after the teaching of the lesson as possible. The eight student teachers held a variety of general and personal teaching efficacy beliefs as measured by the Teacher Efficacy Scale (Gibson & Dembo, 1984). The researcher followed the procedures for conducting the stimulated recall interviews as outlined in Chapter Three. Each interview lasted

approximately forty-five minutes and was audiotaped. Each interview was transcribed and responses to the interviewer's questions were analyzed.

The interviewer's main role was to probe for the student teachers' thoughts about successful teaching in their own lessons and feelings relating to their general and personal teaching efficacy beliefs specifically relating to the teaching of the lesson. Although the established procedure allowed for student teachers to select instances from the videotaped lesson for discussion, it was found that little discussion occurred without interviewer interaction. In each interview the student teacher viewed the videotape of the lesson he or she had taught. However, none elected to stop the tape on their own initiative to discuss successful teaching instances and recall their thoughts. As a result, the interviewer probed for responses throughout the viewing of the videotaped lesson even when student teachers did not select segments of the tape to discuss. The resulting interviews resembled semi-structured interviews rather than stimulated recall interviews.

The interviewer probed for student teachers' thoughts about successful and less successful teaching instances, for beliefs about their personal influence on the teaching episode (PTE) and for beliefs about other influences on the episode (GTE). Questions were

developed from the sixteen items on the Teacher Efficacy Scale (Gibson & Dembo, 1984). Responses from transcribed interview data were grouped according to the GTE and PTE items and summarized. The following descriptions provide a summary of student teachers' thoughts about their personal influence as well as other influences on the success of their lesson.

Personal teaching efficacy. Student teachers responded to questions regarding beliefs in their own ability to bring about student learning during the teaching of the experimental lesson. All indicated they thought they had accomplished the objectives of the lesson. Only two subjects indicated that they could have challenged pupils more or that they could have planned more activities for the class. The student teachers thought that pupils had accomplished what was expected by the student teacher.

Some of the interview questions related to whether student teachers thought pupil success was influenced by their efforts at teaching. The interviewer probed to determine if the teaching efforts related to finding better ways of teaching, use of more effective teaching approaches, or knowing the necessary steps in teaching the skill. Questions about pupil success were asked in relation to specific pupils seen on the videotape who were identified by both the interviewer and the student

teacher as successfully completing tasks. Responses indicated that occasionally student teachers attributed pupil success to their efforts at teaching through the provision of individual attention, encouragement, motivation or by keeping pupils busy. Circulating among pupils, demonstrating skills, using a command teaching style and providing feedback were mentioned as techniques that brought about pupil success. Comments also reflected a belief that pupil success could be due to influences other than the student teacher's teaching efforts. Overall, few appeared certain that pupil success was due to their direct efforts at teaching. When student teachers thought pupil success might be due to their influence, the influence was mentioned as providing encouragement and motivation for pupils to stay on task.

Some of the interview questions related to whether student teachers thought they could make positive changes in their teaching to help pupils who were having difficulty achieving success. The interviewer asked questions to probe whether the student teachers thought they could adjust the task to the pupil's ability level or accurately assess whether the activity was at the correct level of difficulty. Student teachers indicated that they thought they could assess the difficulty level of tasks and alter them by breaking the task down or

giving further suggestions for clarification. However, when specific pupils were identified as having difficulty, some student teachers indicated that they could not get through to them even by changing the task. They explained that these pupils just did not want to do the activity or that they were not concentrating on what they were doing. Student teachers were also asked if they thought they could redirect disruptive pupils or positively influence pupils who were not doing anything. Only one of the student teachers thought that disruptive behavior occurred frequently in the lesson and indicated that attempts at keeping pupils under control did not work. All other student teachers thought that disruptive behavior was not an issue they had to deal with in their lesson. However, interviewees commented on how they handled pupils who were not doing anything. Only one student teacher, the same one that had to deal with disruptive behavior, indicated that he thought his efforts at redirecting pupil behavior were futile. Others mentioned that they tried providing new tasks, being in close proximity to pupils, or asked pupils to demonstrate their work. While most student teachers thought they had difficulties with pupils not doing anything, only one indicated that discipline or disruptive behavior was a problem.

General teaching efficacy. Student teachers responded to questions regarding beliefs that teachers can influence pupil learning in spite of external obstacles. The interviewer probed for thoughts about influences other than personal teaching efforts that were affecting pupil learning in the lesson. The items on the Teacher Efficacy Scale (Gibson & Dembo, 1984) referred to the influence of youth sport programs, family background, home environment, and the influence of parents as possible influences on pupil learning. Student teachers frequently mentioned the pupils' poor attitude toward gymnastics as a major negative influence on the lesson. Comments indicated a concern that pupils were hard to motivate and that they came to class not expecting to do very much. Only one student teacher thought the pupils' attitude was positive toward gymnastics and that had a positive effect on the lesson.

The interviewer also asked what influence the cooperating teacher might have had on the lesson. Some student teachers felt the cooperating teacher had a positive influence by indicating the pupils were well disciplined or that the teacher had established a good atmosphere for learning. One student teacher thought that the lesson would have been better if the cooperating teacher had been present. Some student teachers thought

the cooperating teacher had minimal influence on the lesson outcome.

The interviewer also asked whether the presence of the videotape camera had an influence on the lesson. Most student teachers responded by saying they did not think the camera influenced the lesson outcome. Some student teachers said they were not sure or that it was difficult to say if the camera influenced the lesson outcome. One student teacher indicated that the research gymnastics lesson was taught out of context with what the students were doing on a regular basis and that was thought to be a negative influence on the outcome. With all interviewees there was a distinct lack of mention of influences such as home or family background or experience in sport programs.

In summary, the interviews did not provide data relating to the stimulated recall of thoughts as the teaching act unfolded. However, the interviews did provide information about student teachers' teaching efficacy beliefs in relation to the actual teaching act. This information can be considered to be supplemental to that found through the use of the Teacher Efficacy Scale (Gibson & Dembo, 1984). As such, this information could best be integrated with the quantitative data found on student teachers' sense of general and personal teaching efficacy.

CHAPTER FIVE

SUMMARY, DISCUSSION AND IMPLICATIONS

Summary

This study investigated the strength of the relationship between student teachers' sense of teaching efficacy with pupils' opportunity to achieve a specified motor skill objective in physical education. The pupils' opportunity to achieve a specified motor objective was used as a representative measure of student teachers' effectiveness. The amount of time pupils were successfully engaged in relevant motor activities (ALT-PE(M)) was used as the criterion of teacher effectiveness. The independent variables which were proposed to explain variation in the amount of pupil ALT-PE(M) were student teacher presage variables and measures of student teacher personal (PTE) and general teaching efficacy (GTE) beliefs. The presage variables that were hypothesized as potential influences on the amount of pupil ALT-PE(M) were the gender of the student teacher, the degree program in which the student teacher was enrolled, the course work completed by the student teacher that was relevant to the experimental lesson objective, the previous teaching experience of the student teacher that was related to the experimental lesson objective and the age of the student teacher.

Student teachers' PTE and GTE beliefs were examined for their relationships with the amount of pupil ALT-PE(M) occurring in lessons. In theory, student teachers' PTE beliefs should correlate positively with higher percentages of pupil ALT-PE(M) occurring in lessons. It was hypothesized that student teachers with higher PTE scores would provide more relevant and successful learning opportunities in relation to the lesson goal. It was also hypothesized that student teachers with the belief that they cannot overcome environmental conditions to help pupils achieve the goal of the lesson would have lower rates of pupil ALT-PE(M) occurring in their lessons. The GTE beliefs would be negatively correlated with pupil ALT-PE(M). The student teachers' teaching efficacy beliefs were hypothesized to be significant predictors of the amount of pupil opportunity to achieve a motor skill objective in physical education.

The specific purposes of this study were to describe student teachers' GTE and PTE beliefs in relation to a specified motor learning objective; to describe pupil opportunities to achieve the motor skill objective in lessons taught by student teachers; to assess the relationship of student teachers' teaching efficacy beliefs with pupil behavior relating to opportunities to achieve the specific motor skill objective; to assess the relationship of presage and context variables with

student teachers' teaching efficacy beliefs and measures of pupil opportunity to achieve the motor skill objective, and to examine the relative importance of variables to the predictability of pupil opportunities to achieve the motor skill objective.

Thirty secondary physical education student teachers who were enrolled in their senior practicum experience voluntarily participated in the study. Each student teacher completed the Teacher Efficacy Scale (Gibson & Dembo, 1984) based on knowledge of the lesson objective that they would be required to teach during their four week high school field experience. Prior to the teaching of the lesson, student teachers were provided the opportunity to discuss the experimental lesson objective with the researcher and were assured that cooperating teachers in the field had agreed to allow them to teach the experimental lesson during their field experience. Student teachers and cooperating teachers agreed that student teachers would plan the lesson with minimal assistance from others. The researcher would provide assistance in the form of resource materials if requested.

The experimental lesson objective taught by all of the student teachers was designed on the basis of the secondary physical education curriculum guide and focused upon specified gymnastics motor skills. The objective

was stated in such a way as to allow the student teacher flexibility to plan and teach the lesson taking into consideration the particular students and context in which they were teaching. The lesson objective was to have pupils demonstrate a sequence of movements based on the concepts of rotation around three body axes. The lesson objective represented a novel learning situation for all pupils in that the sequence of movements had to be created during the lesson and could not have been previously created or practiced prior to the teaching of the lesson.

Experimental lessons taught by student teachers were videotaped in such a way as to enable the researcher to view all pupils throughout the entire lesson. Eight of the thirty student teachers also participated in interviews as soon after the teaching of the lesson as possible. Three observers were trained to be reliable with the ALT-PE observation instrument (Siedentop, Tousignant, & Parker, 1982) and coded the videotaped lessons. The ALT-PE instrument uses a 12 second interval recording format in which a pupil is observed for 6 seconds followed by a 6 second record phase in which behavior is categorized. Three pupils were randomly selected from each lesson as target students for coding. The Scored-Interval method of calculating reliability provided a stringent assessment of reliability by

category. Observers reached and maintained excellent reliability levels, above 80%, prior to and during the coding of videotaped lessons. Reliability checks were done for approximately every third or fourth lesson that was coded.

The interviews followed the teaching and videotaping of the lesson taught by the student teacher. The interviews were audiotaped and later transcribed for analysis. During each interview the videotape of the lesson was replayed and the interviewer probed the student teachers for their thoughts about instances of successful teaching that occurred in the lesson and feelings relating to their GTE and PTE beliefs in relation to the lesson. The interview questions were developed from items on the Teacher Efficacy Scale (Gibson & Dembo, 1984) that were used to determine student teachers' GTE and PTE scores.

Descriptive data were collected on presage variables, GTE and PTE beliefs for student teachers, and on process behaviors occurring during the lessons taught by student teachers. The class was used as the unit of analysis for data analysis. Measures of central tendency, variability and correlation were computed for variables. Subgroup comparisons based upon student teacher presage variables were analyzed with teaching efficacy variables and process behaviors occurring during

the lessons. These subgroups were categorical in nature (e.g., yes, no) and related to student teachers' gender, program, course work, teaching experience and age. Teaching efficacy subgroup comparisons were also analyzed in conjunction with the process behaviors that occurred in lessons. A high teaching efficacy group consisted of eight student teachers who perceived themselves as being able to attain instructional goals and were confident in their ability to overcome situational constraints. A low teaching efficacy group consisted of seven student teachers who indicated that they did not feel capable of attaining instructional goals and were not confident in their ability to overcome situational constraints. Multiple linear regression analysis was conducted to reveal the relative importance of hypothesized variables to the variation in measures of pupil opportunity to learn the motor skill objective for this study. Data from transcripts of interviews were coded according to items of the Teacher Efficacy Scale (Gibson & Dembo, 1984) and summarized in a descriptive form in order to provide supplemental information regarding student teachers' teaching efficacy beliefs relating to the specific lesson taught for this research study.

The descriptive data for student teachers' teaching efficacy beliefs indicated that the distributions for GTE and PTE scores were approximately normal with no scores

found to be extremely above or below the upper or lower quartiles. Student teachers responded in a similar way according to subgroups based on the presage variables of gender, program, course work, teaching experience and age. The results of the one-way analysis of variance indicated that there were no significant differences between sample subgroups in relation to GTE and PTE scores. The results of the correlation analysis indicated that there was no systematic relationship between student teachers' teaching efficacy beliefs and their age, gender, program, course work completed, or teaching experience related to the lesson objective. Thus, the presage variables measured in this study did not relate to variations in student teachers' teaching efficacy beliefs.

Descriptive data on the process behaviors occurring during lessons taught by student teachers revealed that the total motor engagement percentage of pupils was found to average 13.0% and the amount of ALT-PE(M) was found to average 10.6% of the lesson time. Pupil involvement in non-subject matter tasks far exceeded the pupil motor engagement rates that would lead to opportunities to achieve the motor skill objective. The descriptive analysis also revealed that even though student teachers were able to focus approximately half of the lesson time on pupil involvement in motor activities leading to the

opportunity to succeed in the motor skill objective, pupils succeeded at appropriate motor tasks only ten percent of the lesson time. Results of a one-way analysis of variance test indicated that there were no significant differences in pupil motor engagement or ALT-PE(M) rates according to student teacher subgroups based on presage variables measured. It was revealed that student teachers who had completed a relevant course for the lesson objective approached significantly higher motor engagement rates in their lessons. The results of the correlation analysis revealed that there was a significant and positive association between student teachers who have had a subject matter course related to the research lesson objective and higher pupil motor engagement rates. However, the association between the course variable and pupil ALT-PE(M) was not as strong and approached significance at the $P<.10$ level.

Student teachers in high and low teaching efficacy subgroups were compared on the amount of time they provided pupils the opportunity to achieve the motor skill objective. Descriptive data revealed that student teachers in the high teaching efficacy group obtained higher percentages of ALT-PE(M) in their lessons and that the class context was generally more favorable to the achievement of the motor skill objective than for student teachers in the low teaching efficacy subgroup. Results

of a t-test for independent groups indicated that there were no significant differences in the amount of motor engagement time or ALT-PE(M) for pupils of student teachers in high and low teaching subgroups. Approaching a significant level was the amount of time pupils spent on practice of the routine and skills relating to the motor skill lesson objective. The pupils of the high teaching efficacy student teachers spent more time practicing for the routine. There were differences between the high and low teaching efficacy groups in the amount of time that pupils spent on management activities ($t=2.05$, $P=.06$). Pupils of the high efficacy teachers spent much less time on management tasks. Results of the correlation analysis also revealed that student teachers who were in the low teaching efficacy group spent significantly more time on management activities. These activities would tend to provide fewer opportunities for pupils to achieve the specific motor skill objective for the lesson. The skill practice time was negatively correlated with teaching efficacy groups. This suggested that high efficacy teachers spent less time on the practice of isolated skills in comparison to the low efficacy teachers. The positive correlation between practice of the routine and efficacy group suggested that pupils of high efficacy teachers spent more time on practice directly relating to the lesson objective.

However, the correlations for learner involvement variables and student teacher efficacy groups were not statistically significant.

Correlation analysis revealed that there was no systematic association between student teachers' teaching efficacy beliefs and pupil opportunity to achieve the motor skill objective. Approaching significance was the negative relationship of student teachers' PTE beliefs and pupil motor engagement rates. This indicated that student teachers who perceived themselves as capable of achieving the lesson objective tended to have lower pupil motor engagement rates in the lesson. However, student teachers with higher PTE beliefs achieved higher rates of pupil ALT-PE(M) although this finding was not statistically significant. The correlation analysis also revealed that student teachers' GTE beliefs were approaching significance in their relationship to pupil ALT-PE(M). Student teachers with lower GTE scores tended to have higher ALT-PE(M) times which indicated that student teachers who believed they could overcome obstacles to teaching the lesson objective achieved higher pupil ALT-PE(M) rates than did student teachers who believed they could not overcome obstacles.

Multiple linear regression analysis revealed information about the contribution of variables to variation in pupil ALT-PE(M) or motor engagement time.

The stepwise procedure was conducted with either motor engagement or ALT-PE(M) rates as dependent variables. The independent variables were GTE and PTE beliefs, course and age variables. The criteria for entry was set at the probability level of $P<.10$ of the F value. The only model that was generated as a result of the stepwise procedure was one that included motor engagement rate as the dependent variable and course as the independent variable. No other variables were entered into the model. It appears that neither PTE nor GTE beliefs contribute to the predictability of motor engagement or ALT-PE(M) rates. The course variable accounted for 12 percent of the variability in motor engagement rates observed in this study.

The results of this study have provided descriptive data pertaining to student teachers' sense of teaching efficacy, the amount of pupil opportunity to achieve a specified motor objective in lessons taught by secondary physical education student teachers, and relationships among presage, context and outcome variables. The testing of hypotheses through inferential statistical procedures provided results of an exploratory nature and may be useful for future research inquiry. However, this study was not designed as an experimental study and inferential statistical results should be interpreted with caution. Further discussion of the findings of this

study will be done in relation to the findings of previous research and theory.

Discussion

Teacher effectiveness research has typically utilized a paradigm in which measures of teacher presage, context and process (including teacher behavior) variables are used to explain pupil achievement. Teachers' behaviors have been linked to teachers' thought processes (including beliefs). This study explored the relationship between student teachers' teaching efficacy beliefs with the amount of pupil opportunity to achieve a specified motor learning objective. A model was proposed to study presage-process-product variables in this study. Descriptive data have been presented and the results of hypotheses that were tested provided results regarding the relationship among variables measured in this study. Results of the descriptive data and testing of hypotheses are discussed in this section in relation to previous research and theory. Other factors influencing the outcome of the study are then discussed.

Student teachers' sense of teaching efficacy. Teachers' thinking and action are thought to be mediating factors which influence the outcome of teaching (Clark & Peterson, 1986). The teachers' thought process variables measured in this study were PTE and GTE beliefs. The

student teachers in this study indicated with an average high score on the PTE items that they felt confident in their ability to attain instructional goals. The student teachers indicated that they agreed slightly more than disagreed or moderately agreed that they could positively influence pupil learning. The student teachers were virtually centered on the scale which indicated that they agreed and disagreed equally in beliefs that good teachers are able to overcome constraints in teaching. Metzler and Reif (1986) also found that teachers had high PTE and moderate GTE scores with averages for their sample (n=5) almost the same as found in this study. The Teacher Efficacy Scale (Gibson & Dembo, 1984) was also used for the Metzler and Reif (1986) study. This study did not measure changes in teaching efficacy beliefs over time and it is impossible to say whether scores would have changed significantly from the time of completing the Teacher Efficacy Scale (Gibson & Dembo, 1984) to the time of teaching the experimental lesson objective.

Theory suggests that presage and context variables influence teachers' attitudes and behavior (Ashton, 1985; Ashton & Webb, 1982, 1986). It appeared in this study that student teacher presage variables (such as gender, program, course work or teaching experience related to the lesson objective, age) and the context variable of class size did not have a relationship to variations in

GTE or PTE scores. It also appeared that there was no systematic relationship between the presage and context variables measured in this study and the student teachers who were in the high and low teaching efficacy subgroups. Research has suggested that class size might affect teaching efficacy beliefs (Ashton & Webb, 1986). The influence of the cooperating teacher was not measured quantitatively as a context variable in this study but the interview data suggested that the cooperating teacher had minimal influence. Several student teachers indicated that the cooperating teacher had neither a positive or negative influence on the lesson outcome.

However, student teachers did comment upon pupil attitude toward the subject matter as being a negative influence on the lesson outcome. Pupil attitudes and beliefs were not measured in this study. Previous research has suggested that student characteristics have influenced teachers' attitudes and behavior (Ashton, 1985; Ashton & Webb, 1982, 1986). Theory on self-efficacy makes the assumption that self-efficacy expectancy is a predictor of behaviors whose outcomes are valued by the individual performing the behavior and Maddux and Barnes (1984) have suggested that research must take into consideration the value placed on the outcome of behavior. The interview data indicated that pupils in the lessons questioned the value of the

experimental lesson objective and this may have influenced the student teacher's desire to accomplish high standard outcomes. However, one could assume from efficacy theory that higher efficacy teachers would be persistent in having pupils attain lesson goals even if pupils were difficult to motivate. Also, there was no measure taken in this study of how much value the student teacher or cooperating teacher placed on the experimental lesson objective. One might assume that the value the student teacher placed on the lesson would be reflected in the GTE and PTE beliefs.

Student teachers indicated that they were fairly confident that they could achieve the experimental lesson objective and the interview data supported this belief. All student teachers that were interviewed indicated that they felt they achieved the lesson objective and that pupils accomplished what the student teacher had expected. However, the low pupil motor engagement rates observed during lessons taught by student teachers would suggest that either the student teachers in this study did not successfully fulfil the goals of the lesson objective or that the student teacher had a different perception of success than that of process based research. Although all student teachers in this study had the same lesson objective to teach, the results from interviews and from observed pupil motor engagement rates

on relevant tasks suggested that student teacher expectations of pupils did influence the amount of pupils' success at accomplishing the lesson objective. Research in physical education has indicated that teacher expectations of students influences the amount of student successful engagement in appropriate tasks (Martinek & Karper, 1983). A direct statement of the student teachers' expectations of pupils for the lesson could provide useful information in future research.

Student teachers attributed some of the success of the pupils to their encouragement, motivation or efforts at keeping pupils on task. Discipline or disruptive behavior did not seem to be a major concern for student teachers but the interview data indicated concern for motivating pupils and keeping them busy on relevant activities. The results of the interview data tended to support previous research that indicated that perceptions of effective teaching are frequently reported as keeping pupils busy, happy and good (Borys & Fishburne, 1986; Earls, 1981; Harootunian, 1980; Harootunian & Yarger, 1981; Placek, 1983; Schempp, 1985; Templin, 1981; Zahorik, 1980). Schempp (1986) found that student teachers tended to perceive pupil failure as outside the teacher's responsibility. When individual pupils were identified as having difficulty with the task, or as not doing anything, the student teacher tended to explain

that the pupil did not want to do the activity or that he or she was not concentrating. It appeared that keeping pupils busy was a concern for student teachers in this study.

Process variables measured with ALT-PE. Process variables include observable teacher and student behaviors that occur during the teaching-learning interaction. Research on teacher effectiveness has indicated that many processes which contribute to effective teaching and learning are consistently being identified (Brophy, 1979; Brophy & Good, 1986; Dunkin & Biddle, 1974; Good, 1983; Locke, 1984; Rosenshine & Furst, 1973). Process-product research assumes that the teacher has an important influence on pupil achievement and that teacher behaviors have a direct impact on pupil outcomes (Doyle, 1977). Process variables relating to pupils' successful engagement time in appropriate activities have been significantly related to pupil achievement (Berliner, 1977; Brophy & Good, 1986; Fisher et al., 1981; Graham & Heimerer, 1981; Rosenshine & Furst, 1973; Siedentop, Birdwell, & Metzler, 1979). The ALT-PE instrument has been used for research in physical education because it provides a measure of process variables which have strong relationships to learning (Placek & Locke, 1986; Rosenshine, 1978; Siedentop, Birdwell, & Metzler, 1979).

The results of this study indicated that pupil ALT-PE(M) percentages for the gymnastic lessons taught by student teachers ranged from 3.9% to 21.3% with a mean percentage rate of 10.6%. The overall motor engagement rate was found to have a mean percentage of 13.0%. Gymnastics lessons have usually had lower student time-on-task percentages as compared to other activities (Costello & Laubach, 1978; McEwen & Graham, 1982; Metzler, 1980; Pieron, 1979, 1981, 1982a, 1983a; Pieron & Cloes, 1981; Pieron & Hann, 1980; Rate, 1981; Whaley, 1980). The reported rates vary according to the observation instrument used but estimated rates of 10% pupil engagement times in gymnastic lessons has been suggested (Pieron, 1981). The ALT-PE(M) time of students in gymnastic activities has been reported as low in comparison to other activities (DePaepe, 1985; Grant, 1983; Metzler, 1980; Rate, 1981). Research also has indicated that student teachers tend to have lower pupil motor engagement and ALT-PE(M) rates than experienced teachers (Paese, 1982, 1985, 1986; Pieron, 1982b; Pieron & Cloes, 1981; Twardy & Yerg, 1987). The findings of this study appeared to be consistent with other studies which examined pupil motor engagement time in gymnastics lessons taught by student teachers. It remains a disturbing fact that the pupil motor engagemant rates in gymnastic activities is very low, reflecting an

opportunity for pupils to achieve motor skills for only 10% to 13% of the total lesson time.

Student teachers in this study devoted 54% of the lesson on the average to subject matter motor activities. Thus, the context for learning allowed for over half of the lesson time to provide learners with opportunities to achieve the motor skill objective of the lesson. Research results have indicated that during lessons teachers tend to involve learners in content activities approximately 80% of the time and in general activities not related to lesson objectives about 20% of the time (Dodds, 1983; Godbout, Brunelle, & Tousignant, 1983; Grant, 1983; McKenzie, Clark, & McKenzie, 1984; Metzler, 1980, 1981, 1986a; Rate, 1981; Silverman, Dodds, Placek, Shute, & Rife, 1984). It appeared that student teachers in this study provided fewer opportunities for pupils to achieve the motor skill objective of the lesson than has been reported in other studies.

The pupils involved in the lessons taught by the student teachers in this study averaged 38% of their time on cognitive tasks. Another 16% of their time was spent on activities that were to ready them for the activity and another 16% of their time was spent on activities that were off task and not related to the goal of the lesson. Research has indicated that student activities involving waiting or transition, knowledge focus and non-

engaged activity time all decrease the amount of ALT-PE(M) time in a lesson (Birdwell, 1980; Godbout, Brunelle, & Tousignant, 1983; Hart, 1984; Mancini, Wuest, Clark, & Ridosh, 1983; Mckenzie, 1986; Metzler, 1986a; Paese, 1985, 1986; Ratliffe, 1986; Rife, Shute, & Dodds, 1985; Silverman, 1982, 1983, 1985a, 1985b; Wuest, Mancini, Van der Mars, & Terrillion, 1986; Wurzer, 1983). The amount of time that pupils spent in cognitive tasks appeared to detract the most from their opportunities to achieve the motor skill objective for the experimental lesson. It appeared that student teachers in this study had pupils involved in listening to instruction, watching a demonstration or participating in a discussion for over one third of the lesson time and these activities decreased the amount of ALT-PE(M) time that pupils achieved. The amount of pupil off task plus waiting activities amounted to approximately one third of the lesson as well. Thus, student teachers in this study had pupils either thinking about the activity (but not doing it) or not involved with relevant activity at all for about two thirds of the lesson time. The interview data indicated that student teachers were aware of having difficulties with pupils who were not engaged in appropriate activities. It appeared that student teachers in this study were similar to other teachers who

are not able to keep pupils in contact with criterion material with high success rates (O'Sullivan, 1986).

Most of the pupils' successful motor engagement time in this study occurred during practice of the gymnastic routine. Research has indicated that pupils who perform more criterion tasks tend to perform better in gymnastics (DePaepe, 1985; Grant, 1983; Pieron, 1982a, 1982b, 1983a; Pieron & Hann, 1980; Rate, 1981; Yerg, 1981b). It appeared that the student teachers' choice of practice activities relating to the practice of the routine reflected attempts to keep pupils engaged on relevant tasks directly related to the experimental lesson objective. The student teachers who selected the practice of the routine activities were more effective in obtaining higher motor engagement percentages in lessons.

An examination of ALT-PE(M) and motor engagement percentages by subgroups in the sample indicated that female student teachers, student teachers who had a related course for the experimental lesson objective, and student teachers who had no teaching experience had higher pupil engagement rates. However, the results of testing the hypothesis that variations in pupil engagement rates were partly due to variations in subgroups from the sample indicated that there were no significant differences between sample subgroups in relation to ALT-PE(M) and motor engagement percentages.

It is interesting that a trend toward significance occurred when comparing student teachers who had taken a relevant course for the lesson objective with those who had not taken a course. The correlation data indicated that the course variable was significantly related to motor engagement times and showed a trend toward significance with the ALT-PE(M) rates. The course work variable is an interesting one in that if student teachers have related course work background information it will help them achieve higher pupil engagement times. It is obvious from the findings of this study that the course work variable influenced general motor engagement rates to a greater extent than ALT-PE(M) rates. Thus, although the course work variable has an influence on motor engagement rates there appears to be the need for course work to help student teachers focus on lesson objectives and ways of keeping pupils engaged successfully on appropriate tasks.

Class size was not highly related to pupil engagement rates nor was it a significant variable influencing variations in pupil engagement times.

These findings are difficult to compare with previous research because few studies have been conducted with secondary physical education student teachers in gymnastics lessons. Studies of student teachers teaching gymnastics skills have tended to report more general

pupil engagement times rather than ALT-PE(M) times (Pieron, 1982b, 1983a; Pieron & Cloes, 1981; Pieron & Hann, 1980; Yerg, 1980; 1981b; Yerg & Twardy, 1982). Although the research has indicated that grade level variations can account for great differences in pupil engagement rates, this study held grade level constant. Also, the research has indicated that student teachers tend to have lower pupil engagement times and there is the indication that student teachers vary according to whether they are teaching early in their training or later (Paese, 1985). This study did control for the influence of various stages of development on the part of the subjects by using a sample consisting of students who were at the same stage of their program.

Relationships between student teachers' sense of teaching efficacy and process variables. The strength of the relationship between student teachers' sense of teaching efficacy and process variables measured during the teaching of lessons was calculated through correlation and multiple linear regression procedures. Although not statistically significant, it was found that a low negative relationship existed between student teachers' GTE and pupil ALT-PE(M) ($r=-.22$, $P=.12$) and a low negative relationship existed between PTE and

pupil motor engagement rates (r=-.24, p=.10). The relationships between teaching efficacy beliefs and achievement in mathematics and communication skills reported by Ashton and Webb (1986) were strong in comparison to those found in this study. The pupils in the Ashton and Webb (1986) report were from homogeneous pupil groups (low achievers). Based on two items, significant relationships were found between GTE and mathematics achievement (r=.78, P<.003) and between PTE and communication skills (r=.83, P<.02). A trend toward significance was found for the relationship of the item for GTE and language scores (r-.71, P<.07) (Ashton, 1985; Ashton & Webb, 1982; Ashton & Webb, 1986; Ashton, Webb, & Doda, 1983).

Theory has predicted that teachers with a low sense of GTE may believe students cannot be influenced by teaching or they cannot overcome obstacles in order to have pupils achieve learning objectives. Theory also has predicted that teachers with a low sense of PTE may believe they do not have the capability to influence pupil achievement (Abramson, Seligman, & Teasdale, 1978; Ashton, 1985; Ashton & Webb, 1982, 1986; Ashton, Webb, & Doda, 1983; Bandura, 1977). Likewise, theory postulates that teachers high on both efficacy variables will behave with active responsiveness and persistence to achieve goals. It was disappointing in this study to find that

the relationships between student teacher efficacy beliefs and the process measures of pupil engagement rates (used as the criterion of pupil opportunity to achieve lesson goals) did not achieve statistical significance. Metzler and Reif (1986) found conflicting correlations for GTE and ALT-PE(M) (positive on one occasion and negative on another). However, one theoretical hypothesis was supported in that student teachers' sense of GTE approached significance and was in the right direction in relationship to pupil ALT-PE(M) rates observed in this study. This finding indicated that student teachers who believed that good teachers could overcome obstacles to teaching achieved higher rates of successful motor engagement rates by pupils. However, the findings of this study did not support the theoretical hypothesis regarding PTE and pupil motor engagement time leading to achievement. The negative correlation found in this study indicated that student teachers who believed they had the capability to achieve lesson goals actually acquired lower pupil motor engagement rates. However, the correlation between PTE and pupil ALT-PE(M) rates showed a positive relationship. The student teachers in this study who had high PTE beliefs appeared to have difficulty achieving significant levels of pupil motor engagement or ALT-PE(M) rates. Metzler and Reif (1986) also found a negative correlation

between PTE and ALT-PE(M) (r=-.33 and r=-.35 on two occasions).

A closer look at the process variables observed during the teaching of lessons indicated that none of the process behaviors observed during lessons were significantly related to either GTE or PTE beliefs of student teachers. However, the amount of time spent on management activities, interim and pupil waiting time were related to student teachers' GTE beliefs. The direction of the relationship was in the direction postulated by theory and indicated that student teachers who believed they could overcome obstacles achieved lower rates of management and wait time in their lessons. However, the amount of interim time was negatively correlated with GTE beliefs indicating that student teachers who believed good teachers could not overcome constraints had higher amounts of pupil interim activities. The lower rates for management and waiting time observed would add to the opportunity for pupils to have higher rates of ALT-PE(M) in the lesson. It was also found that student teachers with high PTE beliefs were able to achieve less time on interim (interruption of ongoing activity) activities. This observation would suggest that students with high PTE beliefs should be able to have high rates of pupil engagement time in appropriate motor behaviors. However, this was not found

to be the case in this study. Thus, the findings of this study suggest a relationship may exist between teacher efficacy beliefs and some teaching behaviors. However, that relationship will vary from situation to situation (Ashton, 1985; Ashton & Webb, 1982, 1986; Ashton, Webb, & Doda, 1983; Gibson & Dembo, 1984). The behaviors observed in this study that closely relate to teaching efficacy beliefs were time spent on management, interruptions (interim) or waiting. Each of these behaviors will influence the amount of motor engagement and ALT-PE(M) time. Metzler and Reif (1986) found no statistically significant correlations between process behaviors and teacher efficacy beliefs and their observed correlations were inconsistent over two occasions of collecting data. However, their sample size was small (n=5) and the type of activity taught varied from lesson to lesson. Since few studies have examined the relationship of teachers' sense of efficacy and process behaviors through systematic observation techniques, it is not possible to conclude that teachers' efficacy beliefs do influence process behaviors. The indication is that few, if any, process behaviors are influenced by teachers' efficacy beliefs.

The criterion measure of teacher effectiveness used in this study was a time variable and a more specific measure of pupil achievement may produce significant

relationships. The research supports the use of the ALT-PE(M) variable as a measure of teacher effectiveness in physical education (Metzler, 1980, 1983b; Pieron, 1983a, Siedentop, 1983b; Siedentop, Birdwell, & Metzler, 1979) and there is also the suggestion that the amount of criterion time on task has distinguished more effective from less effective physical education teachers (Graham, Soares, & Harrington, 1983; Phillips & Carlisle, 1983; Pieron, 1982b, 1983a). However, unless the concept of engaged time is made very specific it does not represent opportunities to learn motor skills (Pieron, 1981, 1983a). The definition of motor appropriate responses in gymnastic lessons needs to be specific enough to distinguish pupil successful responses to relevant tasks from other motor responses if it is to be a reliable measure of behavior in physical education (Alexander, 1983). The coding definitions used in this study for pupil engagement were specific enough to distinguish between pupil behavior that was related to the objective of the lesson. A more specific motor skill achievement test may have been able to distinguish between more or less effective teachers.

Student teachers who were placed in high or low teaching efficacy subgroups because of their scores on the GTE and PTE items of the Teacher Efficacy Scale (Gibson & Dembo, 1984) did show behavioral differences

according to the ALT-PE observation instrument (Siedentop, Tousignant, & Parker, 1982). However, it is not known if the two groups of student teachers were significantly different from each other. Thus, the results must be interpreted with caution. Student teachers in the high teaching efficacy group obtained higher percentages of ALT-PE(M) but slightly lower motor engagement rates than did the low teaching efficacy group of student teachers. This suggested the pupils of the high efficacy teachers were much more successful on relevant motor tasks than pupils of low efficacy teachers. Although this finding was not statistically significant ($t=-1.24$, $P=.24$) it indicated a trend that has been reported in previous research studies. Ashton, Webb and Doda (1983) reported that high efficacy teachers tended to maintain high standards, monitor students' on task behavior and build a friendly, warm climate. Several trends toward significance (probability levels greater than .05 but equal to or less than .10) were found between teacher efficacy measures and teacher behavior. Teachers' GTE beliefs were negatively related to teachers' use of strong control tactics and positively related to a supportive, interactive style that permitted open communication and student involvement in decisions. Teachers' PTE beliefs were positively related to an accepting climate, supportive of student initiative and

concern with meeting the needs of students (Ashton & Webb, 1986; Ashton, Webb, & Doda, 1983).

Gibson and Dembo (1984) also reported that high efficacy teachers attained more student on-task behavior. Teacher effectiveness research has indicated that more effective teachers achieve higher student engagement rates which ultimately affects student achievement (Berliner, 1977; Brophy & Good, 1986; Fisher et al., 1981; Graham & Heimerer, 1981; Rosenshine, 1978; Siedentop, Birdwell, & Metzler, 1979). High efficacy student teachers in this study were able to achieve significantly less pupil management time behaviors. Approaching a significant difference was the time spent on transition and practice of individual skill. Time spent on each of these behaviors was much higher for low efficacy teachers. The time spent on practice of the routine and on warm up were higher for high efficacy teachers. Time spent on managerial activities has been reported as a negative influence on the amount of pupil motor engagement time obtained in physical education lessons (Birdwell, 1980; Hart, 1984; Mancini, Wuest, Clark, & Ridosh, 1983; McKenzie, 1986; Paese, 1985, 1986; Ratliffe, 1986; Silverman, Dodds, Placek, Shute, & Rife, 1984). In order for pupils to learn gymnastics skills they need to spend time performing the criterion tasks (Pieron, 1982b, 1983a; Yerg, 1980, 1981b). Student

teachers in the high efficacy group were more effective in achieving less time on managerial tasks and having pupils more active with activities closely related to the lesson objective than were student teachers in the low teaching efficacy groups. It appeared that student teachers' sense of teaching efficacy was related to some behavioral differences observed in active teaching of lessons in physical education.

Multiple linear regression analysis was used to investigate the strength of variables in the prediction of pupil opportunities to achieve the motor skill objective in this study. It has been found through multiple linear regression analysis that the single original item for GTE significantly improved the prediction of pupils' mathematics achievement scores ($F_{(2,9)}=18.33$, $P<.01$). The item for PTE significantly improved the prediction of pupils' language achievement ($F_{(2,5)}=13.13$, $P<.01$) (Ashton & Webb, 1986). When independent variables relating to GTE and PTE beliefs and course and age variables measured in this study were included in a stepwise procedure it was found that only 12 percent of the variability in pupil motor engagement time was accounted for with the course variable. The findings in this study suggested that GTE and PTE variables did not contribute to the prediction of ALT-PE(M) or motor engagement time.

This study in no way attempted to determine reciprocal effects of pupils on student teachers's sense of efficacy. The lack of significant findings and low correlations in this study may reflect the lack of linear relationships among variables that were measured. The causal direction of the relationships cannot be determined from the analysis conducted in this study. Only the magnitude and direction of relationships were attempted in the analysis. It is impossible to say how much influence the pupils themselves had on student teachers and their behavior. Through student teacher comments during interviews there was the suggestion that pupil attitudes (perhaps pupil self-efficacy beliefs for the lesson situation) were influential on student teacher behaviors during the teaching of the experimental lesson. There was also the suggestion that the experimental nature (one lesson out of context of the regular routine) of the lesson influenced both the pupil behavior and the student teacher attitude toward the teaching of the lesson. These influences may have been significant contributors to the pupil opportunity to learn in this study. A measure of teacher's self evaluation in relation to the specific situation should be attempted in future research studies. It is also impossible to speculate on the influence of the student teachers' sense

of efficacy on achievement gains if learning occurred over an extended period of time.

This research study attempted to control for many factors that appeared to pose problems for interpretation of results in previous research studies. Grade level was the same throughout this study as was type of activity. Both of these variables have significantly influenced the measures of motor engagement time in previous studies. The sample of student teachers were in the same stage of their preservice training prior to the teaching of the experimental lesson objective. The student teachers all had similar exposure to learning experiences in curriculum and instruction classes that might have influenced the process variables measured in this study. Pre-testing of pupils did not influence outcome measures and the experimental lesson objective was novel for all classes. The amount of time allocated for the lesson did not influence measures of pupil motor engagement as coding of pupils occurred from the time student teachers initiated instruction to the time they ended instruction. The time-on-task measures were calculated as percentages of the total instructional time and the total instructional time was similar for all lessons. However, other factors should be considered in interpreting the findings of this study.

The class was the unit of analysis rather than the individual pupil. There was a wide range of individual differences reflected in motor engaged time of individual pupils in the lessons. Target pupils for observation were selected randomly by trained observers. It was assumed that random selection of target pupils would avoid any systematic bias on the part of pupils' previous experiences or skill level.

The experimental lesson involved a somewhat novel learning situation for pupils. It was assumed that pupils who had previous gymnastics experience would still need to actively develop and use their skills in a new situation. Thus, previous gymnastics experience was assumed to not be an important factor in the achievement of the lesson objective. The student teacher would need to instruct and guide in order for pupils to achieve the goal whether pupils had previous gymnastics experience or not. However, the novel experimental lesson objective may have had some negative effects on the pupils and/or the student teachers. Without an attitude survey for pupils and student teachers regarding the experimental lesson it is difficult to say whether student teachers or pupils really thought the lesson goal was a valuable one to work towards. The interview data hinted that the lesson objective may not have been perceived as important

by pupils and the researcher felt that this also may have been true for some of the student teachers.

The experimental lesson objective involved the necessity of student teachers to teach several skills that the pupils could use to formulate a routine. Because several skills were to be taught (and learned) the lesson goal was quite complex. All student teachers indicated they thought they could plan for the experimental lesson objective and none contacted the researcher for assistance in the planning stage. It was evident to the researcher that the expectations of pupils varied greatly among the sample of student teachers. Previous research has indicated the importance of teacher expectations on pupil learning. It was assumed that student teachers with higher efficacy beliefs would aspire to achieve high standards of work from pupils. The flexibility of the lesson objective allowed the student teachers with high teaching efficacy beliefs to aspire for high quality work from pupils, but may have contributed to the lack of discrimination between more or less effective teachers as measured by pupil time-on-task measures.

The model used to study the relationships among variables in this study may have neglected a key element in the process leading to learner product variables: pupil sense of self-efficacy for the given task. It is

clear from teacher effectiveness research that learner behavior affects outcome and ALT-PE(M) time has been significantly related to pupil achievement of motor skills. However, this study did not measure pupils' attitudes or beliefs regarding the experimental lesson. Since self-efficacy theory postulates that a person's behavior is influenced by outcome expectations and efficacy expectations (Bandura, 1977) it could be argued that the pupils' beliefs about their sense of self-efficacy contributed to their behavior. Measures of the pupils' individual differences in the value placed on the experimental lesson objective may have increased the predictive accuracy of more or less effective teachers.

Student teachers in the study were not told specific information about the criteria to be used to measure more or less effective lessons. They had no knowledge that the ALT-PE observation instrument (Siedentop, Tousignant, & Parker, 1982) would be used to code pupil and teacher process behaviors. The experimental lesson objective suggested the importance of motor (versus cognitive or affective) activity. However, student teachers may not have realized its importance. This may have contributed to the inability of the motor engagement variables used in this study to discriminate to a significant extent the differences between high or low efficacy student teachers.

The administration of the Teacher Efficacy Scale (Gibson & Dembo, 1984) occurred prior to the time student teachers had met their pupils, their cooperating teacher or were aware of their specific student teaching situations. Thus, student teachers could respond to the items on the questionnaire according to the experimental lesson objective but could not relate to specifics of their teaching environment. Since efficacy theory and research suggests that efficacy beliefs change from situation to situation, the student teachers were at a disadvantage in accurately indicating what their GTE and PTE beliefs were. This disadvantage may have influenced the findings of this study, especially with regard to PTE scores. Student teachers who indicated they felt they could achieve the experimental lesson objective did not necessarily achieve higher pupil time-on-task rates in this study.

The researcher acquired information about the influence of cooperating teachers through interview data. With the number of student teachers in this study it was assumed that cooperating teacher influence (either positive or negative) would not represent a systematic bias one way or another. The interview data supported this assumption as student teachers felt that cooperating teacher influence was minimal. However, some cooperating teachers were present during the teaching of the lesson

and others were not. Some cooperating teachers taught gymnastics at some time to the pupils while others had not. Some cooperating teachers indicated they valued gymnastics activities while others indicated they did not. All of this information was gathered through informal discussion either prior to or during the teaching of the lesson. It is impossible to say whether cooperating teachers influenced the results of this study.

The presence of the videotape equipment and the researcher was common to all student teachers' lessons. Through interview data student teachers indicated they felt the presence of the equipment and researcher had a minimal influence on the lesson outcome. However, some pupils were inquisitive and did investigate the equipment to have a look at what the class was like on the screen. All pupils in the lesson knew the equipment and researcher were present. However, most student teachers appeared to be able to direct pupil attention away from the equipment. In order to videotape the lesson and keep all pupils on screen at all times, the researcher had to remain at a distance from pupils. It is assumed that the equipment and researcher had a minimal influence on pupil time-on-task measures.

The extent to which the findings of this study can be generalized to other student teacher sample groups, or

to secondary school pupils in general, is limited. All student teachers involved in their senior student teaching practicum volunteered for this study. Only those student teachers who were within an accessible distance from the pre-service institution (urban area) were used. Approximately one quarter of the experimentally accessible population were placed in regions unaccessible to the researcher. Thus, a random sample of student teachers was not drawn.

The use of the experimental lesson objective added to the ecological validity of this study. Other researchers could reproduce the set of teaching-learning conditions used in this study. The experimental lesson was conducted in the natural environment rather than in lab conditions.

This study introduced a disruption to the normal routine of the students. Only a few student teachers were involved in teaching a gymnastics unit during their practicum and those student teachers were teaching quite different skills than those required of the experimental lesson objective. Thus, the negative effects of the disruption may have influenced the findings of this study, obscuring the effects of student teachers' sense of teaching efficacy. However, it was felt by the researcher that all the student teachers in the sample were placed under the same conditions in this regard and

theory suggests that those student teachers with higher teaching efficacy beliefs would strive harder and persist longer to achieve lesson goals.

This study attempted to achieve some of the qualities of a representative design that reflects real-life environments and natural characteristics of learners (Borg & Gall, 1983). The study was conducted in the actual settings that student teachers were placed and included pupils that the student teachers were responsible for teaching. A variety of environments were included in this study by the fact that the thirty student teachers were placed in fifteen different high schools. Also, thirty different cooperating teachers were used in conjunction with the student teachers. This study also included interview data to help interpret the lesson that was taught. Thus, in many ways this study was representative of what actually can happen in the student teaching experience.

Conclusions

This study provided evidence that there was no statistically significant relationship between student teachers' sense of teaching efficacy and measures of pupil motor engagement rates. This fails to support a hypothesized relationship between what student teachers think about teaching and how they act or behave during

teaching-learning episodes in the teaching of gymnastics. This study was designed to investigate relationships among variables rather than prove causality. Although some statistical tests of significance were conducted, the results should be considered for their exploratory value rather than their proof of a causal relationship between variables. The study revealed descriptive data about student teachers' sense of teaching efficacy, the amount of time spent on process behaviors occurring during lessons taught by student teachers to secondary school pupils in gymnastics lessons, and the strength of the relationship between student teachers' beliefs and behaviors observed as a result of their teaching. Based on the findings, limitations and scope of this investigation, the following conclusions are made:

1. There does not appear to be a systematic relationship between student teachers' age, gender, program, course work completed, or teaching experience in relation to their teaching efficacy beliefs for a gymnastics lesson objective.

2. When teaching the gymnastics lesson student teachers were able to provide a class context for the learning of motor skills for approximately half of the instructional time. However, pupils achieved successful motor responses to appropriate tasks for the lesson objective only ten percent of the time. Thus, all

student teachers had difficulty keeping pupils engaged in activities that would provide opportunities to learn motor skills in gymnastics.

3. It appears that having completed a course relevant to the subject matter of the lesson contributes to the success of student teachers in achieving higher motor engagement rates of pupils. Other variables such as gender, age, program, teaching experience with the subject, and class size do not appear to be related to the amount of pupil motor engagement rates achieved by student teachers.

4. Pupils of student teachers with high teaching efficacy beliefs spend more time practicing tasks closely related to the criterion objective. Pupils of student teachers with low teaching efficacy beliefs spend more time on management and practice of isolated skills. Thus, student teachers in high and low teaching efficacy groups have important behavior differences in their lessons relating to providing pupils opportunities to learn.

5. There appears to be no statistically significant relationship between student teachers' teaching efficacy beliefs and pupil motor engagement rates as measured by the teacher efficacy scale (Gibson & Dembo, 1984). However, student teachers who believe they could overcome obstacles to teaching the gymnastics lesson (GTE) tend to

achieve higher pupil successful motor engagement rates. Personal teaching efficacy beliefs tend not to be systematically related to pupil motor engagement rates.

6. A potentially good predictor of pupil successful motor engagement time may be student teachers' completion of related course work. Student teachers' sense of GTE and PTE beliefs do not appear to be predictor variables for motor engagement rates of pupils.

7. Pupils do play an active role in determining what is learned or achieved. They may alter the objectives of tasks that student teachers present and in so doing, adjust the lesson goals. The pupils' self-efficacy beliefs for the lesson objectives and tasks may influence student teachers' expectations and standards thus altering original objectives.

Implications/Recommendations

The presage-process-product paradigm was applied in this study. The presage variable of student teachers' sense of teaching efficacy was correlated with pupil process variables known to have significant influence on pupil learning opportunities in physical education. From the results obtained, it appears that the following implications and recommendations are noteworthy for further research on teaching efficacy beliefs in relation

to pupil opportunities to achieve in physical education lessons.

The concerns and perceptions of student teachers can be studied in various ways. There is enough evidence from previous research to suggest that student teachers may not be primarily concerned about pupil achievement. Rather, they may be more concerned with control of student behavior, or with conditions prerequisite for learning. It is known that teacher expectations of pupils influences achievement. Student teachers in this study indicated that pupils may not have valued the lesson. Thus, it is necessary in future research to measure both the student teachers' and the pupils' concerns or values placed on the learning objective to be accomplished. Process behaviors and teaching efficacy beliefs may be influenced by the value placed on the learning objective.

The relationship of teachers' sense of efficacy and pupil achievement have been theoretically presented and investigated through linear models. However, there are many variables that may influence teachers' sense of efficacy. One of the most important influences may be the learners' values or beliefs for the learning situation. The reciprocal nature of the pupil and the teacher relationship should be investigated along non-linear lines of investigation. Teachers' sense of

efficacy (and consequent behavior) is influenced by pupils' beliefs (and consequent behavior) and vice versa. Linear models and methods of analysis may not lead to significant findings because of the dynamic nature of these beliefs.

Measuring teaching efficacy beliefs is difficult. A single instrument administered at a single time may not be sensitive to the real influence of teaching efficacy beliefs on teaching behavior. Additional means of obtaining data on teaching efficacy beliefs through quantitative and qualitative methods would add to the knowledge base about these beliefs. Even brief time lags between taking measures of teaching efficacy beliefs and measures of behavior may lead to inaccurate measures of those beliefs.

Teacher effectiveness research should include contextual variables, process variables and thoughts, perceptions or beliefs that teachers and students assign to events that occur in the learning environment. The mediating process paradigm may facilitate the integration of data from several important perspectives (Doyle, 1977; Yerg, 1983, 1986). However, as is evident from this study, this is a complex undertaking.

This study examined the overt behaviors of the pupils taught by student teachers in physical education. However, research has provided evidence that pupils find

ways to modify program goals or participate at minimal levels (Tousignant & Brunelle, 1982; Tousignant & Siedentop, 1983). This study did not attempt to measure what the pupils' perceived goals were for the lesson and from the low percentages of ALT-PE(M) rates generally found in the lessons there is the indication that pupils found ways to participate at a minimal level. If the goal is too easy, or perceived to be, once a pupil accrues enough motor engagement time minutes to achieve the task, additional time would no longer discriminate between pupils (Metzler, 1983c). There is the need to investigate the pupils' goals for the lesson as well as the teachers'. Perhaps the pupils in this study found ways to modify the student teachers' goals.

The concept of engaged time must be made very specific if it is to discriminate between more or less effective teachers. An improvement to the experimental lesson objective used in this study would be the inclusion of very specific behavioral objectives or the use of a specific motor skill test. Even though all student teachers in this study were to work on the same concepts of movement, the actual specific behavioral objectives varied from one person to the next. All the student teachers thought they had accomplished the lesson objective. A more challenging, specific behavioral

objective may have discriminated those high efficacy teachers from the low teaching efficacy teachers.

The use of the experimental lesson objective should be used in natural settings. Some of the strengths of this study included the control for subject matter or activity, grade level, experience of teacher and use of pupils in their natural setting. Also, the sample was large in comparison to previous research completed with student teachers in the natural setting. Reliable instruments and trained observers added to the reliability of data gathered in this study.

Based on the built-in rigours of this study, one is left questioning the theory that teaching efficacy beliefs influence student teachers' teaching behavior in physical education. Classroom observation data suggest that teachers' sense of efficacy may be related to certain process behaviors that influence pupil achievement. Previous research has suggested trends, not based on significant findings, between classroom observations and teacher efficacy beliefs (Ashton, Webb, & Doda, 1983; Gibson & Dembo, 1984). The previous research has used ethnographic, anecdotal records and rating scales to investigate pupil process behaviors in classrooms. This research study utilized highly reliable and valid systematic observation techniques to observe process behaviors occurring during the teaching of

physical education lessons. It is not evident from this study that teachers' sense of efficacy is significantly related to process behaviors which influence pupil learning in physical education. Although student teachers generally viewed themselves as capable of attaining lesson objectives and perceived their lessons as successful, there appeared to be little systematic relationship of those beliefs and perceptions to the process behaviors observed during the teaching of their lessons. Perhaps teachers' sense of efficacy influences teacher motivation in ways not investigated in this study. There is a need to further investigate teachers' perceptions of teaching in relation to process behaviors which influence learning in physical education.

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APPENDIX A

Volunteer Consent Form and Background Information Questionnaire

L. Thompson, Researcher
Department of Secondary Education
University of Alberta
Edmonton, Alberta
T6G 2G5

Dear Student Teacher:

As part of my doctoral work I am studying the relationship between student opportunities to learn in physical education classes and student teachers' thoughts about their teaching abilities. I am asking you as a current student teacher to assist me by volunteering to participate in this study. As a participant in any phase of the study you will remain anonymous and all data gathered will be used solely for the purposes of the research study. Thus, any evaluation done for purposes of the student teaching experience or for university courses will not be affected as a result of being a participant in any phase of this study. The university instructors and cooperating teachers will not know the results of data collected from student teachers.

As a participant in this study you are asked to complete a short questionnaire regarding your thoughts about your teaching ability. The following informed consent form will have a volunteer number placed on it. This volunteer number will be placed on the questionnaire and will be used with any other data collected from you throughout the study. Your name will not be used.

If you are selected you will also be asked to teach a single lesson during your high school field experience based on a specified objective for high school students. The one lesson will be video taped. Each student teacher will plan the details of the lesson for their own specific class and situation. The lesson plan itself will not be evaluated by the researcher. Cooperating teachers will be contacted and will have previously agreed to the teaching and video taping of the lesson. The researcher will use the video tape to code student behaviors during the lesson.

As a follow-up to the video taping of the lesson a few student teachers will be asked to discuss their lesson by reviewing the video tape with the researcher. It is hoped that these interviews would take place as soon after the video taping as possible.

Your participation in this study will build on information about the thoughts student teachers have about their teaching abilities. It is hoped that information will be gained about the relationship of thoughts to actual teaching behavior and the effect on student behavior in classes. It is important that the research be conducted in typical learning environments so that actual student behavior is observed. As a volunteer for this study you will have the right to withdraw from the study at any time. However, your participation is valued highly as you will be contributing to knowledge about teaching. Thank you in advance for volunteering to participate in this study.

Yours truly,

Linda Thompson, Researcher

Please complete the information below and sign the consent form.
Return this consent form to Linda Thompson.

I, _____, do agree to participate
(Print first name and surname)
in the research study being conducted by Linda Thompson. I am aware of the overall purpose of the study and am aware of my involvement in the study. I am also aware that I will remain anonymous throughout this study and in any written results of data collected through my participation in this study. I am aware that I have the right to withdraw from the study at any time.

Date:_____

Signature:_____

Your volunteer number is _____

Instructions - Please check off the appropriate response for you and/or add information as needed.

A. Your Volunteer Number: _____ B. Today's Date: _____

C. Your Sex: 1. M ____
2. F ____

D. Your Age: _____ years.

E. Type of University program you are currently enrolled in:

1. B. Ed., Major in Secondary P.E. _____
2. B. Ed., After Degree _____ Other Degree(s) Held: _____

F. Did you transfer into B. Ed. Program?

1. No _____
2. Yes ____ From the Faculty of _____.

G. Have you received credit for gymnastics courses taken at the university level?

1. No _____ 2. P.E. 225 _____
3. MOV 351 _____ 4. Other: (please specify) _____

H. Are you a certified gymnastics coach? 1. No ___
2. Yes ___ Level: _____

I. Have you had experience instructing gymnastics?

1. No _____
2. During student teaching _____
3. Other: (please describe briefly)

J. Your experiences as a participant in gymnastics have primarily been:

1. None _____
2. As a student in a junior or senior high school unit on gymnastics _____
3. As a student in a university course that had a gymnastics component as part of the course (e.g. MOV 245) ____
4. As a member of a gymnastics club or team _____
5. Other: (please describe briefly)

APPENDIX B

Pupil Consent Form

L. Thompson, Researcher
Department of Secondary Education
University of Alberta
Edmonton, Alberta
T6G 2G5

Dear Parent or Guardian:

Your child's physical education teacher is working with a student teacher from the University of Alberta. The physical education teacher and the student teacher have consented to have one physical education lesson videotaped for a research project. The purpose of the research is to examine teaching behaviors exhibited by student teachers as they teach physical education lessons. The lesson will be within the guidelines of the Secondary Physical Education Curriculum.

Your child's involvement in the videotaped lesson will be to participate as he/she usually would. All students will remain anonymous to the researcher. The videotape will only be used for the purpose of this specific research project. It will only be used by the researcher for the observation of classroom events resulting from the student teacher's instruction. The videotape will not be shown publicly. Your child's regular physical education teacher will be present at all times during the lesson.

If you have any questions or concerns regarding your child's participation in this single lesson please do not hesitate to contact me or your child's regular physical education teacher. Keep in mind the lesson will be within the curriculum guidelines and the videotape is needed in order to study student teachers while they are teaching a typical class.

Please indicate on the attached form if your child CANNOT participate in the lesson to be videotaped by L. Thompson. Return the form to your child's regular physical education teacher as soon as possible. Without a signed form, your child will be expected to participate in the physical education lesson as usual. Thank you in advance for your cooperation.

Yours truly,

Linda Thompson, Researcher

Please fill this form in only if your child CANNOT participate in the lesson to be videotaped and taught by the student teacher working with your child's regular physical education teacher. Otherwise, ignore this form and do not send it back to the physical education teacher!

I do not provide consent for _____
(Print child's first name and surname)
to participate in the videotaped physical education lesson that will be taught by the student teacher assigned to work with the regular physical education teacher.

Date: _____

Parent/Guardian Name (Please Print)_____

Parent/Guardian Signature _____

Return this form to your child's regular physical education teacher if it is completed by the parent/guardian.

APPENDIX C

Academic Learning Time in Physical Education (1982) - Category Definitions and Decision Log

ALT-PE Category Definitions
(Siedentop, Tousignant, and Parker, 1982)

Specific decisions for theme of Rotation are put in brackets.

Context Level

The first level of decision making focuses on the class as a whole (or a subset of the class) and is designed to describe the context within which student behavior is occurring. There are three major subdivisions at the context level — general content, subject matter knowledge content, and subject matter motor content.

General Content	refers to class time when students are not intended to be involved in physical education activities.
SM Knowledge Content	refers to class time when the primary focus is on knowledge related to physical education content.
SM Motor Content	refers to class time when the primary focus is on motor involvement in physical education activities.

Each of the three main subdivisions at the context level has categories which describe more specifically the nature of the setting within which individual student behavior is occurring. These categories are defined as follows.

General Content Categories

Transition (T) (intro. to the lesson, select a partner or group, change from 1 mat to another, "2 to a mat", setting out mats)	Time devoted to managerial and organizational activities related to instruction such as team selection, changing equipment, moving from one space to another, changing stations, teacher explanation of an organizational arrangement, and changing activities within a lesson.
Management (M) ("listen up", wait for quiet, introduce someone, deal with behavior problem)	Time devoted to class business that is unrelated to instructional activity such as taking attendance, discussing a field trip, lecturing about appropriate behavior in the gymnasium, or collecting money for the yearbook.

Break (B)	Time devoted to rest and/or discussion of nonsubject matter related issues such as getting a drink of water, talking about last night's ball game, telling jokes, celebrating the birthday of a class member, or discussing the results of a student election.
Warm Up (WU) (game to warm up, exercises not related to rotation around axes)	Time devoted to routine execution of physical activities whose purpose is to prepare the individual for engaging in further activity, but not designed to alter the state of the individual on a long term basis, such as a period of light exercises to begin a class, stretching exercises prior to a lesson, or a cooling down activity to terminate a lesson.

Subject Matter Knowledge Categories

Technique (TN) (concepts of rotation, giving suggestions to vary the skill of rotation)	Time devoted to transmitting information concerning the physical form (topography) of a motor skill such as listening to a lecture, watching a demonstration. or watching a film.
Strategy (ST) ("what we will do today", make up a sequence that shows...)	Time devoted to transmitting information concerning plans of action for performing either individually or as a group such as explanation of a zone defense, demonstration of an individual move, or discussion of how best to move the ball down a field.
Rules (R) (discuss points for difficult moves in competition)	Time devoted to transmitting information about regulations which govern activity related to the subject matter such as explanation of the rules of a game, demonstration of a specific rule violation, or viewing a film depicting the rules of volleyball (time devoted to transmitting information about rules governing general student behavior in physical education are coded management).
Social Behavior (SB)	Time devoted to transmitting information about appropriate and inappropriate ways of behaving within the context of the activity such as explanation of what constitutes sportsmanship in soccer, discussion of the ethics of reporting one's own violations in a game, or explanations of proper ways to respond to officials in a game.

Background (BK)	Time devoted to transmitting information about a subject matter activity such as its history, traditions, rituals, heroes, heroines, records, importance in later life, or relationship to fitness.

Subject Matter Motor Categories

Skill Practice (P) (parts of the whole routine, practice the roll, the cartwheel, the turn...)	Time devoted to practice of skills or chains of skills outside the applied context with the primary goal of skill development, such as a circle drill in passing a volleyball, one against one practice of dribbling a basketball, exploration of movement forms, practicing the Schottische step, or practicing a particular skill on a balance beam.
Scrimmage/routine (S) (refinement of whole sequence, you have 3 more minutes to put together your routine)	Time devoted to refinement and extension of skills in an applied setting (in a setting which is like or simulates the setting in which the skill is actually used) and during which there is frequent instruction and feedback for the participants — such as, a half court five on five basketball activity, the practice of a complete free exercise routine, six against six volleyball (all with instructions, suggestions, and feedback during the scrimmage).
Game (G) (performance for others, the teacher, for a mark)	Time devoted to the application of skills in a game or competitive setting when the participants perform without intervention from the instructor/coach — such as a volleyball game, a complete balance beam routine, the performance of a folk dance, or running a half-mile race.
Fitness (F)	Time devoted to activities whose major purpose is to alter the physical state of the individual in terms of strength, cardiovascular endurance, or flexibility such as aerobic dance, distance running, weight lifting, or agility training (the activities should be of sufficient intensity, frequency, and duration so as to alter the state of the individual).

Learner Involvement Level

The second level of decision making focuses on the individual learner(s) and is designed to describe the nature of the learner(s) involvement in a more specific way. There are two major subdivisions at the learner involvement

level -- not motor engaged and motor engaged.

Not Motor Engaged	refers to all involvement other than motor involvement with subject matter oriented motor activities.
Motor Engaged	refers to motor involvement with subject matter oriented motor activities.

Each of the two main subdivisions at the learner involvement level has categories which describe more specifically the nature of the learner's involvement. These categories are defined as follows.

Not Motor Engaged Categories

Interim (I) (interruption of same activity, move back to start position, one waits while other does and changeover is interruption)	The student is engaged in a noninstructional aspect of an ongoing activity such as retrieving balls, fixing equipment, retrieving arrows, or changing sides of a court in a tennis match.
Waiting (W) (wait a turn when mat is being used)	Student has completed a task and is awaiting the next instructions or opportunity to respond such as waiting in line for a turn, having arrived at an assigned space waiting for the next teacher direction, standing on a sideline waiting to get in a game, or having organized into the appropriate formation waiting for an activity to begin.
Off-task (OF) (waiting but mat is available, doing nothing, doing wrong skill for task set)	The student is either not engaged in an activity he/she should be engaged in or is engaged in activity other than the one he/she should be engaged in -- behavior disruptions, misbehavior, and general off-task behavior, such as talking when a teacher is explaining a skill, misusing equipment, fooling around, fighting, disrupting a drill through inappropriate behavior.
On-task (ON) (while doing Wu, T, M, taking off socks to get ready, move from 1 mat to another, move to start position to start another activity, change in task focus)	The student is appropriately engaged carrying out an assigned non-subject matter task (a management task, a transition task, a warm up task) such as moving into squads, helping to place equipment, counting off, doing warm up exercises, or moving from the gym to a playing field.

Cognitive (C) (read a sheet, write down routine)	The student is appropriately involved in a cognitive task such as listening to a teacher describe a game, listening to verbal instructions about how to organize, watching a demonstration, participating in a discussion, or watching a film.

Motor Engaged Categories

Motor appropriate (MA) (success around 80%, for the person)	The student is engaged in a subject matter motor activity in such a way as to produce a high degree of success.
Motor inappropriate (MI) (a fall or non successfull attempt at a skill, too difficult for person)	The student is engaged in a subject matter oriented motor activity but the activity-task is either too difficult for the individual's capabilities or the task is so easy that practicing it could not contribute to lesson goals.
Supporting (MS)	The student is engaged in subject matter motor activity the purpose of which is to assist others learn or perform the activity such as spotting in gymnastics, feeding balls to a hitter in a tennis lesson, throwing a volleyball to a partner who is practicing set up passing, or clapping a rhythm for a group of students who are practicing a movement pattern.

ALT-PE CODING SHEET (1982)

Volunteer Number: ___

Volunteer Sex: M F

Grade: ___
Class Sex: M
F
Coed

Lesson

Date: / /
D M Y

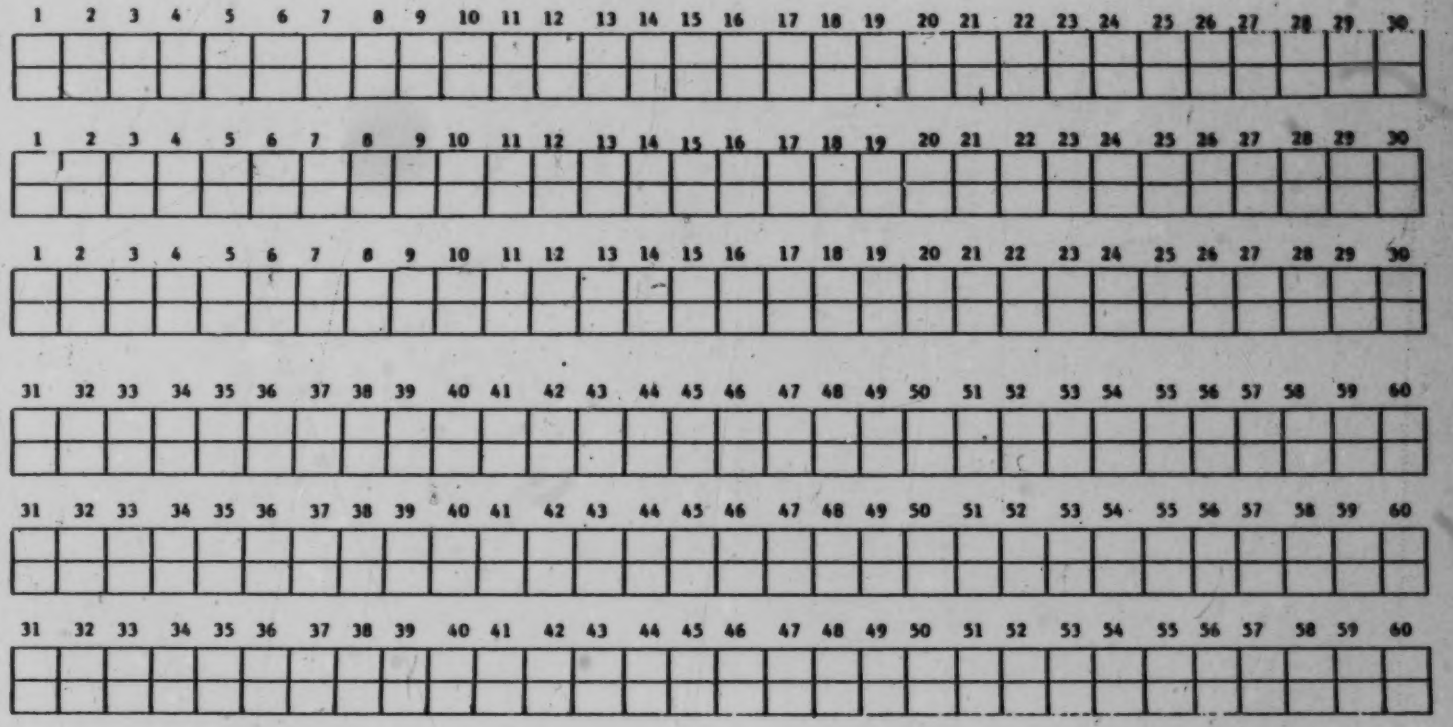
Coder:_____

Coding Date: / /
D M Y

Describe Students Coded:
S1:

S2:

S3:



COMMENTS:

Context Level

General Content	SM Knowledge	SM Motor
Transition (T)	Technique (TN)	Skill Practice (P)
Management (M)	Strategy (ST)	Scrimmage/Routine (S)
Break (B)	Rules (R)	Game (G)
Warm Up (WU)	Social Behavior (SB)	Fitness (F)
	Background (BK)	

Learner Involvement Level

Not Motor Engaged	Motor Engaged
Interim (I)	Motor appropriate (Ma)
Waiting (W)	Motor inappropriate (Mi)
Off-task (Of)	Supporting (Ms)
On-task (On)	
Cognitive (C)	

APPENDIX D

The Teacher Efficacy Scale

Teacher Scale

_____ Date _____

Directions: Read each statement carefully and circle the ONE response category that best describes your current beliefs. Respond by considering the following objective as the one for which you would plan and teach a lesson:

> "The students will demonstrate a sequence of movements which combine a variety of forward and backward rolls, cartwheeling actions and turns in such a way as to produce a smooth flowing sequence of movement from start to finish. The students must demonstrate that the actions performed in the sequence show three different types of rotations around the three axes of rotation: the vertical, sagittal and horizontal."

Please complete every item.

	Strongly disagree	Moderately disagree	Disagree slightly more than agree	Agree slightly more than disagree	Moderately agree	Strongly agree
1. When a student does better than usual (in performing a skill) during physical education class, it is usually because I exerted a little extra effort as the teacher.	1	2	3	4	5	6
2. The time students spend in my physical education class has little influence on students compared to the influence of youth sport programs.	1	2	3	4	5	6
3. If parents comment to me that their child behaves much better at school than he/she does at home, it would probably be because I have some specific techniques of managing his/her behavior which they may lack.	1	2	3	4	5	6
4. The amount that student can learn relating to physical skill is primarily related to family background.	1	2	3	4	5	6
5. If a teacher has adequate skills and motivation, she/he can get through to the most difficult students.	1	2	3	4	5	6
6. If students aren't disciplined at home, they aren't likely to accept my discipline.	1	2	3	4	5	6
7. I have enough training to deal with almost any learning problem.	1	2	3	4	5	6
8. My teacher training program and/or experience has given me the necessary skills to be an effective teacher.	1	2	3	4	5	6
9. Many teachers are stymied in their attempts to help students by lack of support from the community.	1	2	3	4	5	6
10. Some students need to be placed in slower groups so they are not subjected to unrealistic expectations.	1	2	3	4	5	6
11. Individual differences among teachers account for the wide variations in student achievement.	1	2	3	4	5	6

12.	When a student is having difficulty in performing a skill, I am usually able to adjust the task to his/her level.	1	2	3	4	5	6
13.	If one of my new students cannot remain on task for a particular (practice, drill) assignment, there is little that I could do to increase his/her attention until he/she is ready.	1	2	3	4	5	6
14.	When a student performs a skill better than usual, it is usually because I found better ways of teaching that student.	1	2	3	4	5	6
15.	When I really try, I can get through to most difficult students.	1	2	3	4	5	6
16.	A teacher is very limited in what he/she can achieve because a student's home environment is a large influence on his/her achievement.	1	2	3	4	5	6
17.	Teachers are not a very powerful influence on student achievement when all factors are considered.	1	2	3	4	5	6
18.	If students are particularly disruptive one day, I ask myself what I have been doing differently.	1	2	3	4	5	6
19.	When the movement skills of my students improve it is usually because I found more effective teaching approaches.	1	2	3	4	5	6
20.	If my principal suggested that I change some of my physical education curriculum, I would feel confident that I have the necessary skills to implement the unfamiliar curriculum.	1	2	3	4	5	6
21.	If a student masters a new skill quickly, this might be because I knew the necessary steps in teaching the skill.	1	2	3	4	5	6
22.	Parent conferences can help a physical education teacher judge how much to expect from a student by giving the teacher an idea of the parents' values toward education, discipline, etc.	1	2	3	4	5	6
23.	If parents would do more with their children, I could do more.	1	2	3	4	5	6
24.	If a student did not remember information I gave in a previous lesson, I would know how to increase his/her retention in the next lesson.	1	2	3	4	5	6
25.	If a student in my class becomes disruptive and noisy, I feel assured that I know some techniques to redirect him quickly.	1	2	3	4	5	6
26.	School rules and policies hinder my doing the job I was hired to do.	1	2	3	4	5	6
27.	The influences of a student's home experience cannot be overcome by good teaching.	1	2	3	4	5	6
28.	When a child progresses after being placed in a slower group, it is usually because the teacher has had a chance to give him/her extra attention.	1	2	3	4	5	6
29.	If one of my students couldn't do a physical activity, I would be able to accurately assess whether the activity was at the correct level of difficulty.	1	2	3	4	5	6
30.	Even a teacher with good teaching abilities may not reach my students.	1	2	3	4	5	6

APPENDIX E

Experimental Lesson Objective

The Experimental Lesson Objective:

As part of the study being conducted by L. Thompson, selected student teachers who volunteer for the study are asked to plan a single lesson for one class that they will be teaching during their high school field experience. The cooperating teacher will have given permission for the student teacher to plan and teach a lesson based on the following gymnastic lesson objective:

> The students will demonstrate a sequence of movements which combines a variety of forward and backward rolls, cartwheeling actions and turns in such a way as to produce a smooth flowing sequence of movement from start to finish. The students must demonstrate that the actions performed in the sequence show three different types of rotations around the three axes of rotation: the vertical, sagittal and horizontal.

The lesson objective focuses upon concepts dealing with rotation (Secondary Physical Education Curriculum, 1984, p. 125) and aims to develop in each student "...the ability to demonstrate mechanical principles and motor patterns in the gymnastics sequences both on the floor and in formal/informal equipment arrangements..." (Secondary Physical Education Curriculum, 1984, p. 23).

Student teachers should plan the lesson according to their particular teaching situation and should not plan the lesson with anyone else. Cooperating teachers can provide necessary information on facilities and equipment and the background of students but should not be used for lesson content ideas. The researcher will provide resource material to facilitate student teacher's planning if it is requested. The lesson plan itself will not be evaluated by the researcher.

The lesson should focus on the motor skill accomplishment of each and every student in the class that is being taught. Although there is plenty of flexibility allowed for teaching styles etc., the student teacher should keep the objective in mind when planning and teaching the lesson.

Linda Thompson, Researcher